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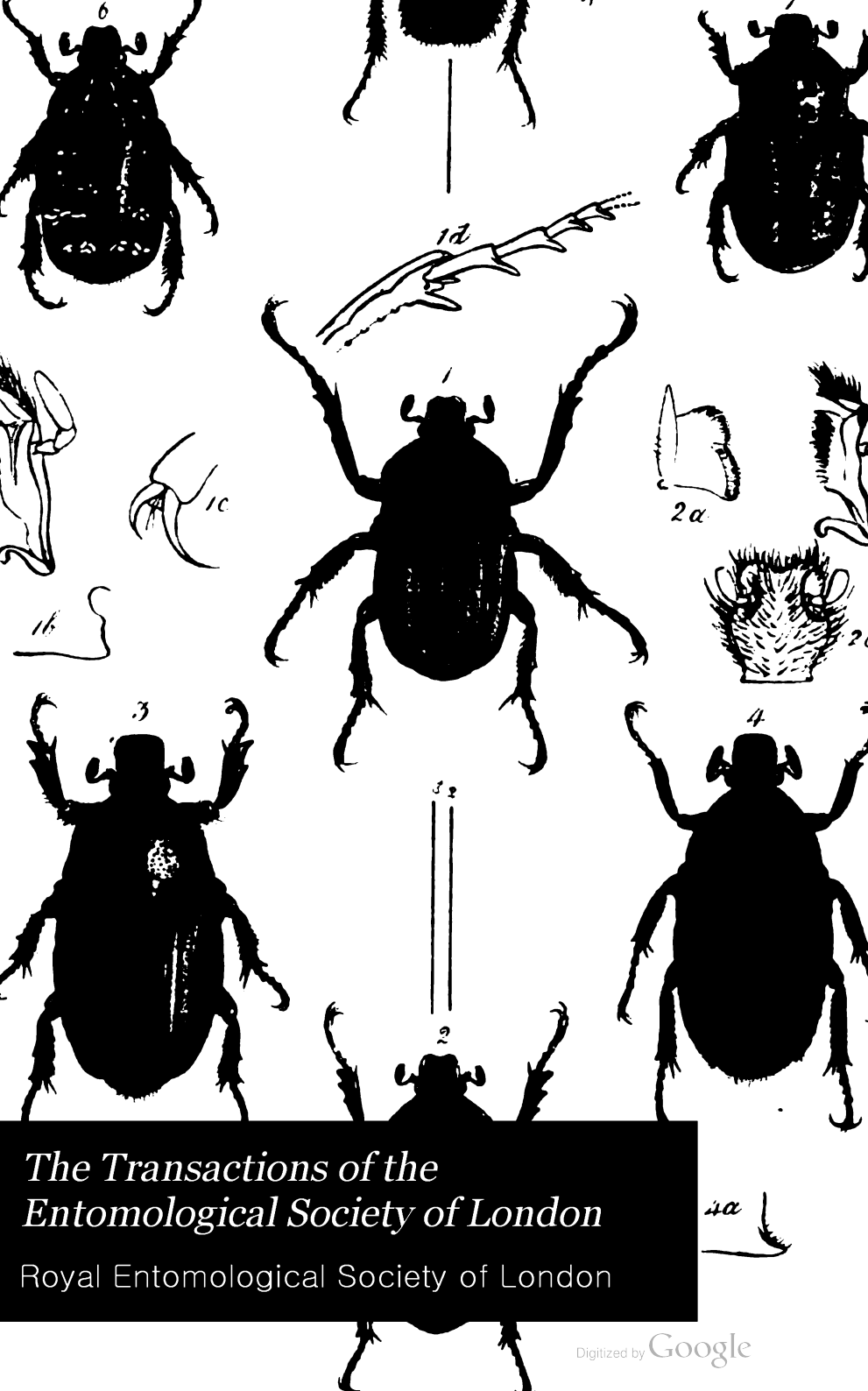

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ADDITIONS TO THE COLLECTIONS

FROM THE 1st JANUARY, 1852, TO THE 31st DECEMBER, 1853.

ANOPLURA.

Rev. L. Jenyns ....A collection of British species.

ARACHNIDÆ.

Mr. R. H. Meade ..A collection of sixty British species.

COLEOPTERA.

Mr. Ed. Bowring....*Apate Bambusæ*.
Mr. Douglas ..... Do. do.
Mr. Foxcroft .....*Boletophagus crenatus*, two specimens.
Mr. Gwynn .....British, various.
Mr. T. J. Stevens ...Larva, with a *Sphæria* attached.
Mr. A. R. Hogan ...*Diglossa mersa*, two specimens.
Rev. H. Clark .....*Haltica pubescens*, eight specimens.
Mr. D. W. Mitchell..*Lucanus Cervus*, a specimen from the Pyrenees.
Mr. Pratt .....*Oryctes Martabani*, a specimen.
Miss Hornby. .....*Zophorus Mexicanus*, a specimen.

CRUSTACEA.

Miss Hornby .....*Phyllosoma clavicorne*, a specimen.

DIPTERA.

Mr Spence .....*Glossina morsitans*.

HYMENOPTERA.

Mr. J. Lubbock ....*Sirex duplex*, specimens.
Mr. F. Smith.....*Vespa Britannica*, Illustrations of natural history of.

LEPIDOPTERA.

Mr. A. F. Sheppard..British, various.
Mr. Douglas ..... Do. do.
Mr. Bond ..... Do. do.
Mr. Bedell ..... Do. do.
Mr. T. Boyd ..... Do. do.

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LEPIDOPTERA—*continued*.

Mr. Edwin Shepherd . British, various.
Mr. P. H. Vaughan .. Do. do.
Major Sheppard .... Do. do.
Mr. Bond ..... Do. *Aglossa cuprealis*, six specimens.
Rev. Jos. Greene .... Do. *Boarmia Abietaria*, &c. &c.
Mr. J. B. Hodgkinson . *Coremia erutaria*, &c.
Mr. Shield ..... *Hydrelia Blomeri*.
Mr. N. Greening .... *Hydræcia Petasitis*.
Mr. Foxcroft ..... *Lælia cænosa*, two pairs.
Mr. T. J. Stevens .... *Morpho Cytheris*, a specimen.
Mr. R. S. Eldeston .. *Plusia bractea*.
Rev. J. Johnson .... *Plutella Dalella*, six specimens.
Mr. J. Scott ..... *Sciaphila*, new species.
M. Becker ..... Various, European.
Mr. J. Stevens ..... Various, from Bogotà.

STREPSIPTERA.

Mr. S. S. Saunders .. Illustrations of the natural history of some Albanian species.

MISCELLANEOUS INSECTS.

Professor Thompson . A collection of Chinese.
Mr. J. C. Bowring .. A box of Chinese.
Viscount Goderich .. A box of Brazilian.
Mr. Thwaites ..... A collection of Cingalese.
Signor Passerini .... A collection from Florence.
Mr. Weaver ..... Various, British.
Mr. J. Scott ..... Do. do.

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List of Members

OF

THE ENTOMOLOGICAL SOCIETY

OF LONDON,

JANUARY 2, 1854.

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LIST OF MEMBERS

OF

THE ENTOMOLOGICAL SOCIETY

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Honorary Foreign Members.

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Gravenhorst, Prof. J. L. C. Breslau, Silesia.

Haan, Herr W. de. Haarlem.

Hammerschmidt, Herr L.

Klug, Dr. Frederick. Royal Museum, Berlin.

Kollar, Herr. Royal Museum, Vienna.

Lefebvre, M. Alexandre. Bouchevilliers, près Gisors, Département de l'Eure.

Passerini, Signor Carlo. Professor of Zoology, at the Royal Museum, Florence.

Zeller, Professor P. C. Gross-Glogau, Silesia.

Zetterstedt, Professor J. W., Ph. D. &c. University of Lund.

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Marked † *have compounded for their Annual Subscriptions.*
Marked S. *are Subscribers.*

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•		Heales, G. S., Esq. Doctors' Commons.
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1849	S.	Ingall, Thomas, Esq. 16, Park Road, Stockwell Park.
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1849	S.	Saunders, S. S., Esq. Albania.
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*	†	Saunders, W. W., Esq., F.L.S. East Hill, Wandsworth.
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1851		Sheppard, Major E., F.L.S. Ditto.
1852		Sheppard, Edward, Esq. 5, Ladbroke Place, Notting Hill.
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1851		Simkiss, Rev. J. M. St. Mary's, Oscott, Birmingham.
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1851		Zuchold, Ernst A. Halle, Prussia.

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INSTITUTED NOV. 5TH, 1838.

Date of Election.

1842 Boys, Capt. India.
1844 Buonaparte, Prince Lucien.
1844 Barnston, George, Esq. Hudson's Bay.
1846 Blagrove, Lieut. Thomas. 26th Bengal Infantry.
1846 Bowman, John, Esq. Bombay.
1846 Brain, T. H., Esq., Principal of Sydney College, New South Wales.
1847 Bowring, J. C., Esq. Hong Kong.
1847 Bowring, L. B., Esq. Bancoorah, near Burdwar, Bengal.
1849 Blair, Daniel, Esq. Surgeon General, British Guiana.
1850 Bach, Herr M. Boppard-on-the-Rhine.

1839 Cantor, Dr.
1844 Costa, Signor Achille. Naples.
1844 Chiaga, Signor Stephano Della. Naples.
1852 Cox, F., Esq. Van Diemen's Land.

1839 Downes, Mr. Ezra.
1850 Dalton, H. G., Esq. George Town, Demerara.

1846 Elliott, Walter, Esq. Madras.

1841 Fraser, Louis, Esq. H.M. Vice-Consul, Whidah.

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1847 Gray, W., Esq. St. Petersburg.
1849 Goding, F., Esq., M.D. Barbadoes.

1844 Harris, Dr. Cambridge, Massachusetts, U.S.

1846 Layard, F. P., Esq. Bengal Infantry.
1846 Layard, E. L., Esq.
1846 Leconte, Major. New York.
1848 Low, Hugh, Esq. Labuan.

1839 M'Lelland, J., Esq. Calcutta.
1840 Mitchell, Sir Livingstone.

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Date of Election.

1846 Pope, John, Esq. Hong Kong.
1846 Peters, Francis, Esq. Zanzibar.

1839 Schomburgh, Sir R.
1839 Sayers, Lieut.
1842 Stevenson, —.
1846 Smith, Dr. G. Madras.
1852 Stevens, T. J., Esq. Bogota.

1849 Thomas, Grant, Esq. Barbadoes.

1841 Wiegand, Sir F.
1845 Wilkinson, Sir J. Gardner.
1847 Wilson, C. A., Esq. Adelaide, South Australia.
1849 Wallcott, R. B., Esq., M.D. Barbadoes.

1841 Younger, Lieut. John Robertson.

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PROCEEDINGS

OF THE

ENTOMOLOGICAL SOCIETY OF LONDON.

1852.

February 2, 1852.

J. O. Westwood, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for February; by the Editor. The 'Literary Gazette' for January; by the Publishers. 'Revue et Magasin de Zoologie,' 1851, Nos. 1 to 10; by M. Guérin Méneville. 'Insecta Britannica'—Diptera, Vol. i.; by the Publishers. 'Entomologische Zeitung' for December and January; by the Entomological Society of Stettin. 'Journal of the Royal Agricultural Society of England,' Vol. xx., Part 2; by the Society. 'Synopsis of the Cleridæ of the United States;' 'On the Pselaphidæ of the United States;' 'Descriptions of new species of Coleoptera from California;' 'An Attempt to Classify the Longicorn Coleoptera of the part of America north of Mexico;' all by John L. Le Conte, M.D., and presented by the Author. Three specimens of a species of Bostrichus that feeds on Chinese bamboo cane; by Mr. Bowring. Phyllosoma clavicorne, one of the glass-shrimps, captured at sea, on the passage from Central America to the South Pacific; Zopherus mexicanus, caught on an island in the bay of Fonseca, St. Salvador, and one of the Mutillidæ; all presented by Miss Elizabeth Hornby. A collection of insects of all orders, from Shanghae; presented by Professor Thompson of Glasgow, through Dr. Carpenter.

Mr. F. Cox, of Van Diemen's Land, was elected a Corresponding Member of the Society.

The President appointed Messrs. John Curtis, J. F. Stephens, and H. T. Stainton, Vice-Presidents for the year.

The President read the following note from Mr. Spence, and exhibited the vase and insects referred to; the latter appear to be an undescribed species.

"18, Lower Seymour Street,
"February 2, 1852.

"My dear Sir,

"I beg to send from Mr. E. A. Bowring, of the Board of Trade, for the inspection of the Society, a Chinese carved vessel or vase of bamboo, the interior of which has been much injured by one of the minute Bostrichidæ, of which specimens are gummed on the card in the box enclosed herewith, and of which Mr. Bowring

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begs the Society's acceptance. I will thank you to let the vase be sent back to me, that I may return it to Mr. Bowring, and also a note with the name of the beetle, if it is a known species. If a new one it might be called Bostrichus (or whatever is its modern genus) Bambusæ.

"I am, My Dear Sir,
"Yours very truly,
"W. SPENCE."

"J. O. Westwood, Esq."

Mr. Curtis remarked that this exhibition was interesting, inasmuch as bamboo was usually free from attacks of insects, and indeed, on that account the canes were imported to make fences and for other purposes.

Mr. Douglas, on the part of Mr. C. S. Gregson of Liverpool, exhibited a drawing on rice-paper, by his friend Sylvester Diggles, Esq., of the British specimen of Gastropacha Ilicifolia in Mr. Gregson's collection. The beautiful execution and softness of effect of this drawing elicited great admiration.

Mr. Douglas exhibited some specimens of Lithocolletis Carpinicolella, reared during the last month by Mr. Stainton, from hornbeam leaves gathered in October and November. Mr. Douglas remarked that it was a great advantage, by means of heat, to rear such small species as this in the winter, when the collector had more time to devote to setting them out, than the pressure of other captures in summer-time would generally permit, and in insects of such delicacy it was a matter of importance that this operation should be performed with nicety.

The President exhibited a female of the Psyche, which Mr. Weaver, in a note read at a former meeting, sought to establish as a species distinct from P. opacella. Mr. Weaver had informed him that Mr. Doubleday could not see the legs Mr. Weaver asserted he had discovered; but being confident from the habits of the larva, and other circumstances, that it is a distinct species, he had sent it to the President for inspection. He had accordingly examined it, but the specimen had been mutilated in the endeavour to make the legs apparent, and he was therefore not able to pronounce so decisively as he wished, but it appeared that there were, or rather had been, three pairs of membranous, cylindrical appendages; the first close to the head, the second adjoining, and the third, posterior. He would not assert that these were legs, for they were not articulated, but they were certainly tubuliferous and not merely membranous appendages. The insect was destitute of antennæ, in which also it resembled some other species of Psychidæ and the Oiketici.

Mr. J. F. Stephens thought that the insect in question did not differ, as regarded its legs, from females of P. opacella, which the President said he had not had an opportunity of examining.

Mr. Adam White exhibited a small collection of insects, chiefly Coleoptera, made by Dr. Joseph Hooker during his late botanical researches in the Khasya Hills. He enumerated Cercidocerus Hookeri, *White*, Broscus Nepalensis, a new species of Morimus allied to M. tristis, Dictyoptera Javetiana, Coryphocera tibialis, Rhomborina amethystina, Lema 4-maculata, Urophora Hardwickii, *Gray*, a Coccinella allied to 7-punctata, and Geotrupes orientalis, remarkable as a species of a genus rare everywhere but in Europe and America. Several species, Mr. White observed, were especially interesting as confirming the views of the geographical distribution of insects propounded by Mr. Hope in Royle's 'Himalaya.'

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In the collection of insects from Shanghae on the table, Mr. White pointed out a new species of Lamia, and a Pontia almost identical with a common British species.

The President read a Memoir on the Neuropterous genus Mantispa, including descriptions of several new species.

Mr. Dallas read a Memoir on some new species of Hemiptera.

Mr. Curtis read some observations on the synonomy of the British species of Acanthosoma.

Mr. F. Smith read a note on the Pediculus Melittæ of Kirby, tending to show that it was not the larva of any insect as had been supposed.

March 1, 1852.

J. O. Westwood, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—'The Zoologist,' for March; by the Editor. 'The Literary Gazette,' for February; by the Publishers. 'Entomologische Zeitung,' for November; by the Entomological Society of Stettin. 'Exotic Butterflies, being Illustrations of new Species selected chiefly from the collections of William Wilson Saunders and William C. Hewitson: with coloured drawings and descriptions of each species.' By W. C. Hewitson. Part 1; presented by W. W. Saunders, Esq. 'Ueber den Character der Insecten-Fauna von Süd-Persien;' von V. Kollar & Dr. L. Redtenbacher. 'Beitrag zur Entwicklungsgeschichte eines neuen Blattlausartigen Insectes, Acanthochermes Quercûs,' von V. Kollar. 'Ueber Weinbeschädigung durch einen kleinen Nachfalter, Tortrix Roserana, *Frol.*, in den Weingarten von Brunn nächst Mödlung,' von V. Kollar. 'Ueber einen bisher noch nicht beobachteten Feind des Weinstockes,' von Custos Kollar. 'Beiträge zur Kentniss des Haushaltes und der geographischen Verbreitung einiger in okomischer und technischer Hinsicht nichtigen Insecten,' von V. Kollar. All presented by Herr V. Kollar, Honorary Foreign Member. 'Tavola sinnotica dei generi spettanti alla classe degli Insetti artroidignati Hemiptera, *Linn.*, *Latr.*, Rhyngota, *Fab.*, Rhyncota, *Burm.*'; Memoria del Socio attuale Signor Marchese Massimiliane Spinola, Foreign M.E.S.; presented by the Author. "A List of Insects and other Animals either injurious to Agriculture or of interest to the Farmer." By J. Curtis, F.L.S. (From Morton's 'Cyclopædia of Agriculture'); presented by the Author. A box of Insects from Hong Kong; by J. C. Bowring, Esq., Corresponding M.E.S. A box of British Lepidoptera; by A. F. Sheppard, Esq. A box of British Lepidoptera; by Mr. Douglas. Specimens of Sirex duplex; by J. Lubbock, Esq.

Mr. Lubbock exhibited a quantity of Sirex duplex, which he had brought for distribution among the members. This species was abundant in woods between Bromley and Seven Oaks, where their larvæ did much damage to larch trees; it was remarkable that in a quantity which Mr. Lubbock had reared, the proportion of females to males was 1 in 100.

Mr. Adam White, on the part of Mr. Leycester, exhibited some insects from New Holland and New Zealand, among which he pointed out Campylocnemus Schrœteri,

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Schreibers, as remarkable for its curved hind-tibiæ approximating to the curious, curved, sub-fossorial hind-tibiæ of the allied genus Scaptocarenum from New Zealand, a formation of these members not otherwise known among the Carabidæ. He also noticed Ænigma longipenne as an insect possessing remarkable characters.

Mr. Bond exhibited a pupa of Sphinx Ligustri, with the sheath of the spiral tongue distinctly bifurcate.

Mr. Augustus Sheppard exhibited a remarkably pale specimen of Arge Galathea?

Mr. S. Stevens exhibited beautiful specimens of Ornithoptera Priamus from Cape York, Australia; of Cocytia D'Urvillei from New Guinea; Carabus Lafossei from Shanghae; and Xylotrupes dichotomus from the North of China, near Pekin. He also exhibited Epicalia Antiochus and Myscelia Medea, which Mr. Bates had observed to be sexes of one species; a thing never hitherto suspected, on account of the difference of colour and marking.

The President observed that when informed of this discovery of Mr. Bates, he had examined the specimens in the British Museum referred to these genera, and found the Epicaliæ to be males and the Mysceliæ to be females. The genus Catonephile of Doubleday would likewise have to be abolished, the species therein being mostly referrible to Epicalia.

Mr. Douglas exhibited the larva of a Dipterous insect voided by a gentleman who had been for a long time in ill health. It was white, naked, and attenuated, and differed materially from the larvæ expelled from a human body, described by the Rev. Leonard Jenyns in this Society's 'Transactions' (vol. ii. p. 154), as they had on each segment a pair of minute, soft processes, fringed with bristles, which, when viewed in the aggregate, formed a double longitudinal series down the back. In that instance, also, the larvæ were expelled in large quantities, whereas in the present but few had been observed. Some medical gentlemen doubted if these were really insect larvæ; but all the members present who examined the specimen sent, agreed that it was a Dipterous larva, belonging probably to the Muscidæ. Some discussion arose on the question how insect larvæ came into human bodies; the prevalent opinion seemed to be that they were introduced with food: in illustration of which the President mentioned that at the Jardin des Plantes in Paris, some of the serpents that had been fed on flies, of which they were very fond, after a few weeks became greatly swollen, and shortly died, when it was found that they were full of Dipterous larvæ, which had doubtless hatched from fertile eggs in the flies on which they fed, and had caused their death.

Mr. Douglas exhibited pieces of a stem of Solanum Dulcamara, gathered a few days since, in which larvæ of Gelechia costella were hybernating.

Mr. Adam White exhibited a specimen of a Belostoma, an aquatic Hemipterous insect, taken on board ship near Bassorah, in the Persian Gulf: many more were reported by the captain to have fallen on the vessel from a "cloud" of them flying over.

Mr. Saunders had often seen Belostomæ two or three together, flying about in the evening, near Calcutta; but it was something new to hear of them in such quantities, and at sea.

Mr. Douglas exhibited a specimen of Monochamus Sartor, taken last year on the banks of the Regent's Canal; and a specimen of Coccinella Reppensis, taken by himself last July, crawling on the ground in the hilly field, Headley-lane, near Mickleham.

Mr. S. Stevens mentioned that again for the third season he had reared Dryophila Anobioides from the same dry stump of broom; and Mr. Smith remarked that for

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seven successive years he had bred Ochina Ptinoides from a piece of dry ivy-stem in his possession.

The President directed attention to the insects presented by Mr. J. C. Bowring, especially to the extraordinary parasite upon Fulgora candelaria, which was undoubtedly Lepidopterous, resembling a Bombyx or Orgyia, and for which Mr. Bowring proposed the name of Epipyrops anomala.

Mr. White alluded to a collection of insects sent from China by Mr. Fortune, in which he had seen Dicranocephalus Wallichii, hitherto reputed to have been found in Nepaul.

Mr. Curtis read a paper on a method of removing mouldiness from preserved insects, by means of the vapour of boiling alcohol, applied by an apparatus which he described, to a whole drawer-full at a time, and in the course of a few minutes not a trace of mould would remain, and not one of the insects required to be touched or removed.

Mr. Desvignes remarked that he had operated on some mouldy insects with naphtha in which a small portion of corrosive sublimate was dissolved; but although an effectual method, it occupied a long time to wash each insect.

Mr. White, with reference to methods of preserving insects, said that the Italians had a mode of preserving Crustacea so that the joints remained flexible; some specimens in the British Museum, received from Madame Power, had been thus pliant for years. The means by which this was accomplished were not known.

Mr. Douglas read the following translation from the Stettin 'Entomologische Zeitung,' premising that it referred to an insect, still one of our rarest Lepidoptera, and trusting it might be the means of many specimens being captured.

"The Larva of Phorodesma smaragdaria, (*Esper*). By G. Koch, senr., Frankfort-on-the-Maine.

"Hitherto this larva and its natural history have been entirely unknown;* neither Ochsenheimer, Treitschke, nor any other author has given any account of it; if they had, the perfect insect would probably not be such a rarity. The moth flies in woods late in the evening, on which account it is seldom taken; and the larvæ are so deceptive to the eye, that they have hitherto eluded all search for them. The merit of solving the riddle belongs to Herr Verwalter Muhlig, who succeeded in finding an impregnated female, which laid eggs, by which circumstance we were put upon the search, and now we find the species not uncommonly in our town woods. I give the following account with this remark, that although it is made exactly after nature, everything is not to be found therein which may be observed with a lens in these most remarkable larvæ. Besides, the matter is sufficiently interesting to render it desirable to be acquainted with the details of the natural history of these larvæ, otherwise than in fragments, as at present, and to learn some particulars about their early states.

"As soon as the larva leaves the egg, it loads its body with finely bitten pieces of stems of plants, scales of flowers, hard, dry, seed-capsules, and other small vegetable fragments, which it binds together strongly, although loosely, and in layers, and forms into a mass full of points and projections (requiring much trouble to pull to pieces with pincers), the whole of which it carries about with it, like the allied larva of Phorodesma

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* Freyer has figured it, vol. i. tab. 174.—*J. W. D.*

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Bajularia. This covering is, however, very different from the cases of the Psychidæ. The larvæ enlarge these coverings according to their requirements, and as they hybernate in them when very small, it is not easy to rear them from that state. The warmth of spring entices them out to the plant on which they feed—the milfoil (*Achillea Millefolium*); when reared in confinement, however, they will feed upon Poterium Sanguisorba. The head of the larva is small, and the fore part of the body is also slender; the hinder part is crossed all over with deep wrinkles and corresponding elevations. Beyond the first segment, the body is flattened on each side; on the back stand four elevations or humps, each terminated by a sickle-shaped hair; a smaller hump stands on each side of the large black spiracle: these six humps, each on a distinct segment, are separated by long furrows, the remaining space is covered with innumerable little warts, which make the larva feel rough to the touch; viewed with a lens, these look like the deep-cleft bark of oak trees. All the remaining segments are covered with these elevations, points, humps and furrows, to which, as may very easily be observed, the little bits of plants are fastened in layers of small bundles. The larva is earth-brown, a long darker line is on the middle of the back, and three, more or less clear, long streaks on each side. It attains eventually the length of a Paris inch, but sits always in a contracted position, and this, added to the unyielding nature of its case, gives it a most deceptive resemblance to a hard seed-capsule or a little mass of flowers.

"When about to go into the pupa state, it seeks a hard flower-stalk, on the top of which, or sometimes only high up thereon, it makes fast fragments of flowers in the form of an open-work case, in which, in about a day, it changes to a pupa, and within three (seldom four) weeks, it appears in the perfect state.

"Light places in woods, plains, and dry ditches in woods, where the plants grow on which they feed, are the favourite localities of these caterpillars. When once one is discovered, several more may certainly be found in that neighbourhood. The best season to seek them is from the beginning to the middle of June, when they have become full fed, and are approaching their transformation. For this purpose it is not necessary to use much apparatus, for if care be not taken, they are very easily deprived of their artistic coverings."

April 5, 1852.

J. O. Westwood, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—'The Zoologist' for April; by the Editor. 'The Athenæum' for February and March; by the Editor. 'The Literary Gazette' for March; by the Publishers. 'Entomologische Zeitung' for February and March, and 'Linnæa Entomologica,' Sechster Band; by the Entomological Society of Stettin. 'Revue et Magasin de Zoologie,' 1851, Nos. 11 and 12, 1852, Nos. 1 and 2; by M. Guérin Méneville. 'Descrizione di alcune specie d'Insetti Fossili,' and 'Catalogo dei Crostacei Italiani e di molti altri del Mediterraneo:' both by the Rev. F. W. Hope, and presented by the Author. 'Nature's Teaching,' a Lecture read at the Annual Meeting of the Worcestershire Natural History Society, October 8, 1851; by the Rev. D. Melville: pre-

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sented by the Author. 'Bulletin de la Société Impériale des Naturalistes de Moscou,' 1851, No. 2; by the Society. 'Proceedings of the Royal Society,' Vol. vi. No. 82—85; by the Society. 'Monographie des Guêpes Solitaires, ou de la Tribu des Eumé-niens,' par H. F. de Saussure, Cahir 1, Paris, 1852; by the Author. 'Entomographie de la Russie,' par G. Fischer de Waldheim, Tome v.: Lepidoptères—Nymphalides, Moscou, 1851; by the Author. A box of Brazilian insects; by Viscount Goderich, through Mr. Curtis. A box of British Micro-Lepidoptera; by Mr. Bedell.

The Rev. J. F. Dawson, Woodlands, near Bedford, was elected a Member; and W. Lancey, Esq., Westminster, was elected a Subscriber to the Society.

Mr. Adam White exhibited some insects, collected by Dr. Joseph Hooker in the Himalaya, directing attention to the Homopterous Urophora Hardwickii, of which the male was seen to possess the same kind of hairy tail-like appendage as the female, in which sex it had been considered to be the ovipositor. Mr. White remarked that the Lepidopterous genus Trichura, *Hübner*, founded on the Sphinx coarctata, *Drury* (Zygæna caudata, *Fabr.*), had a somewhat analogous structure, though much more scaled. He also pointed out Derepteryx Hardwickii, a Nepalese species of Coreidæ, apparently a male specimen.

Mr. White also exhibited some insects, chiefly Coleoptera, collected by Dr. Thompson, of the Hon. East India Company's Service, in Little Thibet, at an elevation of 8,000 feet above the level of the sea; among which Chrysomela fastuosa, Peryphus littoralis, Stenus ater, and others, were identical with the British species.

Mr. White read the following extracts of a letter from J. C. Bowring, Esq., dated Hong Kong, January 29, 1852:—

"I possess in all about fifty Hong Kong Brachelytra, chiefly very small species, and the only peculiarly interesting form among them is an insect of which I have but one specimen, which I captured under a stone on the peak of Mount Parker; the antennæ are pectinated so strongly as to be almost flabellate. I have not duplicates of more than half-a-dozen species, although I collect everything I can lay my hands on, and would take fifty specimens of each insect if I could get them, with the view of increasing my general collection by exchanging. It seems strange that there should be so few Brachelytra from China known in Europe. In Erichson (page 221), Conurus pubescens seems to be the only one mentioned, and that is a well known European species.

"I have found many new Carabideous insects this last season, and have now about eighty species, and fourteen Cicindelæ; the greater part of these are so rare that I have no duplicates. Dr. Dubois, of the French frigate, 'Algerie,' lately found a fine Scarites on the sands of the mainland, opposite Hong Kong; I have searched the spot well, but could not find another specimen. I discovered, however, a very pretty little Notoxus, while turning over the drift weed on the shore.

"I have never met with any more Paussi since my return in 1848; they must be of rare occurrence indeed, as I keep a sharp look-out for them."

The President informed the meeting that M. Groué, of Marseilles, was about to make an entomological tour in Sicily, and wished to enter into communication with entomologists of this country, with a view to the exchange or other disposal of his Coleopterous captures.

Mr. W. W. Saunders mentioned that M. José Apolinario Nieto, Orizava, Mexico,

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a Mexican entomologist, wished to enter into correspondence with English entomologists.

Mr. Edwin Shepherd exhibited larvæ of Botys Urticalis, attached to the under side of a piece of the bark of wood which had formed part of a fence, where they had spun their cocoons and had hybernated, having not yet passed into the pupa state.

Mr. Douglas, on the part of Mr. H. Cooke, exhibited a book of drawings of Indian insects of all orders, belonging to Captain Wroughton, of the Indian Army. The beauty and fidelity of these drawings excited great admiration.

Mr. Douglas exhibited Nepticula aurella, taken at Darenth Wood on the 24th of March, a very early appearance, and N. ignobilella, bred from a leaf of hazel, gathered in the autumn.

Mr. Douglas also exhibited larvæ of Gelechia contigua, in the tops of young shoots of Stellaria holostea, larvæ of G. fraternella in shoots of Stellaria uliginosa, and a full-grown larva of a Nepticula, mining in a leaf of bramble just gathered; many other bramble-leaves he observed had been similarly mined, but the miners had escaped. He mentioned that Mr. Stainton had recently found the terminal shoots of Cerastium viscosum rolled up like those of the Stellariæ, probably by the larvæ of Gelechia, or some closely allied moth.

The President exhibited specimens of Blatta Germanica, sent to him from Kildare, where they had been very troublesome in a house, attacking indiscriminately food and other things to which they could gain access, and living chiefly behind the skirting-boards of the kitchen. The female had her egg-pouch attached, remarkable for being nearly as large as the abdomen. This was the first recorded instance of the species being noxious in houses; in Lapland, B. Lapponica is very destructive to dried fish and other provisions.

The President also read a letter from Sunderland, inquiring the best mode of destroying Blatta orientalis, that common pest in houses everywhere; when several members mentioned as remedies basins baited with bread, and placed where the cock-roaches had easy access to them, from which, on account of their smoothness, the insects could not escape; phosphorus; turpentine sprinkled about the room at night, when they were active, the touch of the least portion proving fatal; a mixture of oatmeal and plaster of Paris; and keeping a hedge-hog, of which animal the Blattæ were a favourite food.

The President exhibited some specimens of the new cochineal insect called Coccus Fabæ, discovered by M. Guérin-Méneville, and described in the 'Comptes Rendus.' The insect fed on the common bean, and rendered an exceedingly brilliant colour. The cultivation thereof on an extended scale had commenced in the South of France, and it was expected would prove a beneficial branch of industry to the peasants.

Mr. Smith communicated the following extract of a letter addressed to him by Dr. Felkin, of Richmond: —

"I had some port wine which I rather prized, packed in straw in wooden cases, in which it remained undisturbed for seventeen or eighteen years, but upon opening the cases I perceived some insect had been preying very considerably upon the corks, in a few cases to that degree that leakage and evaporation had completely emptied the bottles, in others there was only a little loss, but in most cases the corks were more or less destroyed. This partial destruction seemed as if it were prevented from being complete by the wine oozing out in a single drop, and being pernicious to the insect. I cannot form an opinion whether saw-dust may encourage the insect, but I may

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observe that the cellar is very dry. I believe wine-merchants in corking wine compress the cork with instruments, which leave a depression in the corks in which the insect seems to burrow; in some wine bottled at home, in which the cork was only immersed in wine previous to driving it, the ravages of the insect appeared to be less, but I must add that these corks were of the best description. I have not yet employed any means to prevent the evil, but I think of cutting the cork level with the mouth of the bottle, and then dipping it for half an inch at the top into a mixture of yellow bees'-wax, 8 oz., and sweet oil, 4 oz., melted together; or to surround the upper part of the cork with a thin coat of gutta percha; or, after the bottle has been corked, to immerse the mouth in a solution of alum in vinegar. These are plans which, if effectual, would not injure the wine, or render it less fit for drinking."

Some members suggested that the mixture of resin with the bees'-wax would, by rendering the composition harder, prove effectual in excluding the insect, whatever species it might be, its eggs or larvæ.

Mr. Bedell intimated that he had in progress an experiment with some bottled wine, the corks of which were thus affected, to ascertain with certainty the kind of insect causing the damage; at present it was supposed to be the larva of the Lepidopterous Gracillaria? Vau-flava.

Mr. Douglas called the attention of the members to the subject of insects found impaled on thorns, stating that Mr. Gould had informed him, with reference to the specimens presented by him to the Society last year, his opinion was that they were not placed upon the thorns by shrikes, as was generally supposed, because those birds had not at the time he found them arrived in this country, and the insects were uninjured, which was not likely to have been the case if those birds had so placed them; moreover, he afterwards found some bees transfixed on spines of furze in the north of Scotland, where shrikes never go. No doubt shrikes did impale insects, because it was one of their characteristics to hang up their food before eating it, whence they had derived the name of "butcher-birds;" and the same practice obtained also in the aberrant shrikes of Australia, but then they left only fragments of their prey. He believed that insects were blown by gusts of wind on to the thorns. Mr. Douglas further said that he had mentioned the subject to Mr. Doubleday, who told him that he once saw a Leucania Comma transfixed by a spine of dry furze, placed on the top of a garden-wall to keep away cats. The head of the moth was *towards the spine*, as if it had been arrested in the position of its flight at the moment. Mr. Douglas requested the members to bring before the Society any instances of impaled insects that might come under their notice, and that they would observe the position of the insect with regard to the thorn.

Mr. Bond was of opinion that shrikes placed bees on thorns, even in cases where they were found uninjured, for he had known those birds to hang up their prey, leave it, and afterwards return and eat it.

Mr. Douglas exhibited a bee, recently captured, with three female Stylops in the abdomen.

The President said that no greater number than three had hitherto been observed in a bee, but Dr. Burmeister, who had just returned from a sojourn of eighteen months in Brazil, had informed him that he had there seen seven Stylops in one wasp. The President added that Dr. Burmeister had brought with him a large store of insects

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and entomological information, and had directed particular attention to the transformations of the Lepidoptera.

Mr. W. W. Saunders communicated the following note from Mr. S. S. Saunders in Albania, dated "Prevera, March 2, 1852;" and exhibited the piece of bramble-stem referred to: —

"To return to the Hylæus (*H. Rubicola*). I should observe that my object in now sending the briar is to call attention to the middle cell of the three, which has not produced any larva, consequently the store remains therein as at the first, and consists of the liquid acidulous honey which forms their food in the larva state, and the cells are invariably (as in this instance) only half full thereof, the larva being preserved from contamination therewith until ready to feed; and you will further observe that the thin cases wherein such store is deposited, are prepared by the parent Hylæus, and are not to be ascribed to the progeny, the honey-bag containing the store being here preserved intact where no larva has been produced, and closed as at first. The gallery is exclusively that of a Hylæus, without any trace of other inmates, and I conceive that these facts will be deemed to offer conclusive testimony to the non-parasitic habits of Hylæus Rubicola."

Mr. Douglas read the following translation of so much of Zeller's 'Revision of the Pterophoridæ'* as pertains to the early state of such species whose larvæ are known: —

AGDISTIS, *H.*

4. A. adactyla, *H.* Larva probably feeds on Sedum acre or S. sexangulare, the imago being found near Glogau in July, always among these plants, and sometimes also where Gnaphalium arenarium grows.

PTEROPHORUS, *Geoffr.*

5. P. gonodactylus, *W. V.*; trigonodactylus, *Sta.* Herr Fehr, according to Fischer von Röslerstamm, found that the larvæ from the beginning to the middle of March fed inside the flower-stalks of a large-leaved species of colt's-foot (*Tussilago*), near the base. In the flower-head of the same plant lives the larva of Pædisca Brunnichiana.

(In England both these species are found in the perfect state on or about Tussilago Farfara.—*J. W. D.*)

6. P. Zetterstedtii, *Z.*; Aluc. tesseradactyla, *Zett.* The larva feeds on Senecio nemorensis: the perfect insect is found about this plant in July.

7. P. nemoralis, *Z.* Appears in July and August. The larva feeds in the stems of Senecio nemorensis.

10. P. acanthodactylus, *Z.*; Aluc. acanthodactyla, *H.*; Aluc. calodactyla, *Haw.*; Pt. calodactylus, *St.* The larva Zeller once found in July on a flowering Pelargonium in a garden, and having several times taken the imago in places where Geranium Robertianum grows abundantly, he supposes the proper food of the larva to be Pelar-

* 'Linnæa Entomologica,' 6 Band. Berlin, 1852.

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goniums. His friend Schlager, however, informs him that he found the larvæ with those of Pt. phæodactylus on Ononis repens or spinosa; but Zeller adds that he has the species from places where there is neither Ononis nor Geranium.

(In England we find the imago among Ononis.—*J. W. D.*)

12. P. tristis, *Z.*, *Dup.* The larva feeds (probably) on Hieracium Pilosella. The imago appears at the beginning of June and end of August, among pines and birches, in sandy places near Glogau.

17. P. Pilosellæ, *Z.*, *Sta.*; didactylus, *St.*; Hieracii, *Sta.* (*Cat.*) The larva feeds on Hieracium Pilosella.

18. P. Hieracii, *Z.*, *Sta.* (*Cat. Suppl.*) The larva feeds on Hieracium umbellatum. The imago appears in July and August.

19. P. Ericetorum, *Z.* Appears in July and August. Zeller supposes the larva feeds on Hieracium Pilosella.

21. P. obscurus, *Z. Dup.*; parvidactylus, *Haw.*, *Sta.*; microdactylus, *St.* Appears in June and July. The larva feeds on Hieracium Pilosella.

24. P. phæodactylus, *H.*, *Z.*, *Sta.*; lunædactylus, *Haw.*, *St.* Appears in July. The larva feeds on several species of Ononis. Zeller remarks that it eats the flowers.

26. P. mictodactylus, *W. V.*, *Z.* Appears the end of May and in June. The commonest Pterophorus near Glogau, where the larva feeds on Saxifraga granulata.

32. P. graphodactylus, *Tr.*, *Z.* Freyer found the larva in June near Tegernsee (Alps) on Gentiana lutea.

33. P. fuscus, *Retz.*, *Z.*, *Sta.*; fuscodactylus, *Haw.*, *St.* The larva feeds on Veronica Chamædrys (*Stainton*).

36. P. lithodactylus, *Tr.*, *Z.*, *Sta.* The larva feeds in June on Inula salicifolia and I. dysenterica.

38. P. Scarodactylus (*H.* ?), *Z.* The larva feeds on the flowers of Hieracium umbellatum and H. boreale in August and September.

41. P. Inulæ, *Z.* The larva lives in the flowers of Inula Britannica, feeds on the unripe seeds, and is full grown at the end of July. Its presence may generally be known by the disk of the flower having on it brown spots, or, at the part attacked being pushed up into a small elevation. But such flowers are often inhabited only by larvæ of flies, and many flowers containing a larva of this Pterophorus do not exhibit these marks.

43. P. microdactylus, *H.*, *Z.*, *Sta.* Appears in May and July. The larva feeds on the flowers of Eupatorium Cannabinum.

44. P. osteodactylus, *Z.*, *Dup.*, *Sta.* The larva lives (probably) on Senecio nemorensis.

46. P. galactodactylus, *H.*, *Haw.*, *St.*, *Sta.* The larva lives on Arctium Lappa in May.

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47. P. Spilodactylus, *Curt.*, *St.*, *Sta.* Appears in July. The larva feeds on Marrubium vulgare.

51. P. tetradactylus, *L.*, *Haw.*, *St.* Appears in July and August. The larva feeds on Thymus Serpyllum.

52. P. Malacodactylus, *Z.* The long-haired larva feeds on Nepeta Calamintha and probably on other Labiatæ.

54. P. pentadactylus, *L. &c.* The larva feeds on Convolvulus arvensis and C. sepium.

59. P. Siceliota, *Z.* Appears (in Sicily and Dalmatia) in May, June and July. The larva feeds on Ononis pinguis.

ALUCITA, *L.*

6. A. polydactyla, *H.*, *Z.*, *Sta.* Appears in May and June. The larva feeds on the flowers of Lonicera Periclymenum. The flowers attacked are rather more than usually thickened in front, and do not open. The larva bores on the under side of the flower-tube, eats up the inner part of the flower and fills the space with a quantity of dirt.

Part 8 of the current volume of the Society's 'Transactions,' was announced as just ready.

May 3, 1852.

J. O. WESTWOOD, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors: — 'The Zoologist' for May; by the Editor. 'Entomologische Zeitung' for April; by the Entomological Society of Stettin. 'The Literary Gazette' for April; by the Publishers. 'The Athenæum' for April; by the Editor. 'Revue et Magasin de Zoologie,' 1852, No. 3; by M. Guérin Méneville. 'Exotic Butterflies,' by W. C. Hewitson, No. 2; by W. W. Saunders, Esq. A collection of several orders of insects of Ceylon; by Mr. Thwaites, M.E.S. A specimen of Oryctes Martabani; by Mr. Pratt.

The President announced that the Society had determined to offer a prize of £5 for the best essay on the duration of life in the queen, males, and workers of the honey bee, the discovery of these points being of much economic value. Each essay to be addressed "To the President and Council of the Entomological Society," without the author's name attached, and to be delivered before the 31st of December; the name and address of the author to be forwarded separately.

Mr. Edwin Shepherd exhibited a male specimen, in fine condition, of Notodonta Carmelita, taken by Mr. Hill, on the 2nd instant, at West Wickham Wood, on the trunk of an oak.

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The President informed the meeting that among the insects received from Mr. Thwaites, were many rare species, and nearly half the number were unique specimens.

Mr. Adam White exhibited drawings of the nests of two species of spiders; the one, found by S. S. Saunders, Esq., in Albania, was formed of the seed-vessels of Paliurus aculeatus, four of which were arranged symmetrically, and connected by a web: the other was found by M. Weilenmann, of St. Gall, Switzerland, in a wood near Pernambuco; it was of a grayish white colour, with a penthouse-like roof, on which were seven rows of scale-like appendages, and a row round the margin; it was attached by a pedicel, three inches long, to a leaf. M. Weilenmann informed Mr. White that the spider was small, but Mr. White believed he had seen only the young ones.

Mr. White exhibited specimens of a minute Podura, found by Dr. Sutherland on the ice, some miles from the shore of Wellington Channel, under a species of Nostoc growing there. It was closely related to the Desoria glacialis, *Nicolet*, which M. Desor found among the glaciers of the Swiss Alps, in countless numbers, under stones or on the margins of "crevasses et des baignoires." MM. Desor, Pourtales, and Agassiz also saw them running into ice, apparently very compact, but on breaking off a piece it was found to be pierced with numerous canals, into which the Desoriæ leaped and ran, looking like drops of blood.—(Desor, in 'Bibliothèque Universelle de Genève,' n. s. xxxii. p. 125, pl. 2).

Dr. Sutherland added, in answer to a question from the President, that he only found this Podura under the Nostoc; and that although it was in plenty, the individuals remained free, and did not assemble in masses after the manner of the common English Podura. But he had also found what he thought were two other distinct species, under stones where no Nostoc grew.

Mr. White also exhibited some more of the insects collected in the Himalayas by Dr. J. D. Hooker, pointing out especially a beautiful minute Cicindela, a Cercidocerus with two white lines on the thorax, a Distenia, several pretty Phytophaga, including Adimonia variolaris, Aplosonyx fasciatus, &c., the Hemipterous Pœcilocoris Childreni, a new spider of the genus Gastrocantha, and one of the Myriapodous genus Zephronia.

Mr. A. F. Sheppard exhibited specimens of Halias clorana, bred from osiers at Fulham, and a Cerura vinula, var. minax, *Hüb.*

Mr. Grant exhibited twelve specimens of the rare Adela cuprella, obtained by repeated visits to the dwarf sallows on Wimbledon Common during the late cold month of April.

Mr. S. Stevens exhibited a fine series of Goliathus Polyphemus from Cape Palmas, and of Callithea Sapphira, male and female, collected by Mr. Bates at Santarem, on the Amazon river.

The President read the following letter, addressed to him by Mr. Ainger:—

"2, Carlton Hill, Edgware Road,
"April 17, 1852.

"Sir,

"I observe that at a recent meeting of the Entomological Society, you read a paper of inquiry as to the best method of extirpating cock-roaches.

"I have for many years, and in three different houses, used a plan which gets rid of them more rapidly and more completely than any I have heard of.

"In the kitchen hearth, within the fender, but at one side of the fire, I cut a hole

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like that made in the street paving for a coal-plate. In this I place a basin holding a little water (beer would perhaps be better), and into this the creatures fall by wholesale until they are nearly exterminated. During the day an iron plate covers the hole.

"I am, Sir,

"Your obedient Servant,

"J. O. Westwood, Esq." "ALFRED AINGER."

Mr. Douglas read the following note, translated and condensed from the 'Entomologische Zeitung' for April: —

"On Lithosia depressa and L. helveola; by Herr Schreiner, Weimar.

"If we compare these two insects, and read the descriptions of the larvæ by Treitschke (Band x. pp. 164-5), we should feel quite convinced that they were distinct species; but by observing them in nature, both in the larva and perfect states, we may be quite certain that depressa is by no means distinct, but only the female of helveola.

"I would not lay much stress upon the fact that during many years' experience of myself and others in this and other localities, not one male of depressa has occurred, and just as little a female of helveola, although this is curious enough; but I would further mention that although I yearly rear a great many of both kinds from larvæ, which are not scarce in this neighbourhood, mingled together among the lichens upon the common pine (*Pinus picea*), the result is the same. I believe, therefore, that I am correct in putting depressa, hitherto accounted to be a distinct species, as the female of helveola; and the following considerations bear out my view: —

"1. The antennæ of helveola are distinctly ciliated, in depressa, on the contrary, they are setiform, and only when greatly magnified can a few very fine hairs be observed.

"2. The larvæ appear at the same time and on the same food, and mostly together.

"3. They show no striking difference in form, colour, or marking, in these respects not varying more than the caterpillars of most other species.

"4. The habit and pupation are the same.

"5. The period of development is exactly alike.

"I must further remark that I indeed have not yet witnessed the coupling, because it would seem to be very brief, and only to take place at night: however, I have often obtained the eggs of depressa, but never those of helveola. Also, on opening the bodies of a number of helveola, I could not discover a trace of eggs, whereas the bodies of depressa generally contained a great quantity. Unfortunately, I have not yet been able to rear any larvæ from the eggs.

"It is inexplicable to me how these prominent circumstances in the history of these not uncommon insects should have escaped even our latest and best authors; and I feel myself so much the more compelled to incite a more exact examination and inquiry into this and the other species of Lithosia."

Mr. Douglas also read the following extract from Mr. Fortune's 'Journey to the Tea Countries of China:' —

"In the evening we stopped, with some other boats like our own, near a small village, where we proposed to pass the night. The day had been very warm, and the

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moschetoes were now becoming very troublesome. The night before this, neither my servant nor myself had been able to close our eyes, and I now saw with dread these pests actually swarming around us. Our boatmen, who heard us talking about them, asked Sing-Hoo why he did not go and buy some moscheto tobacco, which they said might be had in the village, and which would drive all the moschetoes out of the boat. I immediately despatched him to procure some of this invaluable substance. In a few minutes he returned with four long sticks in his hand, not unlike those commonly used for burning incense in the temples, only somewhat longer and coarser in appearance. He informed me they cost only two cash each—certainly cheap enough if they answered the purpose.

"Two of these sticks were now lighted and suspended from the roof of the boat. They had not been burning five minutes when every moscheto in the boat sought other quarters. We were quite delighted, and enjoyed a sound and refreshing sleep, for which we were most thankful. I had always dreaded these insects during this journey, as I did not carry curtains with me on account of their bulk. I now found, however, that there was no need of them wherever we could procure the moscheto tobacco.

"Various substances are employed by the Chinese to drive away moschetoes. This which we had just purchased was made with the sawings of resinous woods—I believe procured from juniper trees — and mixed with some combustible matter to make it burn. A piece of split bamboo, three or four feet in length, is then covered all over with this substance. When finished it is as thick as a rattan or small cane. The upper end of the bamboo has a slit in it, for hooking on to a nail in the wall or the roof of a boat. When once lighted, it goes on burning upwards until within six inches of the hook, beyond which there is no combustible matter, and it then dies out. A somewhat fragrant smell is given out during combustion, which, at a distance, is not disagreeable. Sometimes the saw-dust is put up in coils of paper, and is then burned on the floors of the houses. Various species of wormwood are likewise employed for the same purpose. The stems and leaves of these plants are twisted and dried, and probably dipped in some preparation to make them burn.

"The moscheto has a mortal aversion to all these substances, and wherever they are burning, there the little tormentors will not come. I procured the sticks in question, and burnt them daily after this; and although the insects were often swarming when I entered the boat or an inn, the moment *their* 'tobacco' was lighted they quickly disappeared, and left me to sit at my ease, or to enjoy a refreshing sleep. Whoever discovered this precious tobacco, was a benefactor to his country, and should have been honoured with the blue button and peacock's feather at the least. But I suppose, like all other Chinese discoveries, it is so old that the name of its original discoverer cannot now be traced."

The following memoirs were read:—

1. Descriptions of five new butterflies, by W. C. Hewitson, Esq., with two coloured plates.

Papilio Telearchus. Hab. Sylhet.

Allied to P. Paradoxa, but larger; different in the contour of the wings and in the relative distance of the blue spots from the outer margin.

Papilio Pausanias. Hab. Surinam and the Amazon.

Allied to P. Choridamas, and especially interesting from its close resemblance

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to Heliconia Clytia. Found by Mr. Bates "at the edge of the water of the Lake of Ega when the river is falling."

Papilio Chabrias. Hab. Amazon.

Allied to P. Triopas. The male flies high in pathways of the forest, the female flies low.

Papilio Orellana. Hab. Amazon.

An unique species in the collection of Mr. Bates.

Papilio Sakontala. Hab. Sylhet.

Allied to P. Polytes, *Cramer*. Unique in Mr. Hewitson's collection.

2. Descriptions, with figures, of some of the Coleoptera collected in China by Mr. Fortune. By W. W. Saunders, Esq.

3. Descriptions of some of the Hymenoptera collected in China by Mr. Fortune. By F. Smith, Esq.

4. Description of a new Brazilian Hemipterous insect, Dinidor gibbus. By W. S. Dallas, Esq.

June 7, 1852.

J. O. Westwood, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors: — 'A List of the Specimens of British Animals in the Collection of the British Museum. — Lepidoptera (continued). 1852.' By J. F. Stephens, Esq., F.L.S.; presented by the Author. 'Statuten und Namen des Mitglieder des Münchener Vereins für Naturkunde.' 'Isis,' Nos. 1, 2, 4, and 6, 1850. 'Systema Insectorum,' tom. i. Coleoptera, Fasc. 1, Mantichora—Dromica: Monachii, 1837, auctore Dr. J. Gistl. All presented by Dr. Gistl. 'Transactions of the Zoological Society of London,' Vol. iv. part 2, 1852; by the Society. A Portrait of Signor Passerini, Hon. M.E.S.; by the Rev. F. W. Hope. 'The Zoologist' for June; by the Editor. 'The Literary Gazette' for May; by the Publishers. A specimen in the finest condition of Morpho Cytheris; by T. J. Stevens, Esq., Bogotà.

Capt. T. Hamilton, of the Indian Army, was elected a Member of the Society.

Mr. Adam White mentioned that a specimen of Acherontia Atropos had been captured at Bressay, one of the Shetland Islands, by Miss Mouatt, of that place, the first instance known of the occurrence of the species so far north in Britain.

Mr. A. F. Sheppard exhibited a remarkably fine specimen of Notodonta Carmelita, taken by Mr. Harrison, of Keswick, on a birch tree near that place; also, on behalf of Mr. N. Cooke, of Warrington, a specimen of Notodonta trepida, reared with others from eggs found in May, 1851, upon a beech tree in Petty Pool Wood, Delamere Forest: the larvæ fed on oak-leaves. Mr. Sheppard also exhibited some specimens of Cemiostoma Laburnella, which he had beaten out of ivy, remarking that he could get none from the laburnums, although there were several of those trees in his garden.

Mr. Hunter exhibited a specimen of Notodonta Carmelita, which he bred on the 8th of May, from a larva beaten out of an oak at Black Park last year.

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Mr. S. Stevens exhibited a specimen of Notodonta Carmelita, taken by him on the trunk of a tree at Wickham Wood, on the 3rd of May.

Mr. Waring exhibited two specimens of Retinia Turionella, one of which he had reared from a shoot of Scotch fir from West Wickham Wood: also a specimen of Antithesia prælongana, from the same locality.

Mr. Edwin Shepherd exhibited two specimens of Trochilium Culiciforme, reared from larvæ found in a stump of birch; also the Ichneumon parasitic on the larvæ of this species, with its cocoon. He likewise exhibited Notodonta trepida, three specimens of the rare Xylina conspicillaris, Cerata Servillana, and Anchylopera Upupana, all taken at Darenth Wood in May.

Mr. Douglas exhibited specimens of Nepticula aurella, reared from bramble-leaves, and the cocoons formed by the larvæ after they left the leaves in which they had fed; from these cocoons, which were green, flat, and shaped like a stock-seed, the pupa-skin was seen projecting.

The President read a letter addressed to him by Robert Smart, Esq., of Sunderland, describing a trap for cockroaches commonly sold in the crockery-ware shops of that town. "It resembles" he says "an inverted basin, with a hole about an inch in diameter at the top, the sides being somewhat rough and rather indented. But the grand desideratum" he continues "is some substance that the insects will greedily eat and which will poison them; in my humble opinion it is a matter not undeserving a scientific investigation, and not unworthy the attention of the Entomological Society."

The President read the following letter from William Atkinson, Esq.:—

"32, Gordon St., Gordon Square, May 31, 1852.

"Dear Sir,

"In March, 1849, I had some correspondence with you respecting the insect that eats the corks in bottles of wine in cellars; and observing by the Reports of the Entomological Society that the subject has been brought before you twice recently, I have much pleasure in presenting herewith to the Cabinet of the Society, a specimen I have succeeded in capturing, which I presume will remove any doubt as to its being the larva of a Lepidopterous insect that commits the ravages complained of. It is somewhat extraordinary that although in every visit to my cellar I make an examination, I have never yet seen a moth or found a chrysalis.

"The question has been debated in your room—'How to get rid of this nuisance?' In my opinion, in addition to cutting close and sealing the corks, the wine should be re-binned *perfectly free from saw-dust*, at the same time carefully removing the saw-dust from the cellar; for in the saw-dust the caterpillar no doubt changes into the chrysalis, and the moth lays its eggs. It is through this medium, I feel certain, the mischief is transmitted from the wine-merchant's cellars.

"It appears to me, that the insect cannot possibly be imported in the cork, as has been suggested, after it has undergone the process of firing, and sometimes, I believe, of boiling, and also the cutting into corks. The very act of driving a cork into a bottle would certainly crush any eggs, in which state only could the insect be in the corks; and I should think it unlikely that the moth is furnished with the means of penetrating the cork, to deposit its eggs therein.

"Begging you will excuse my offering these opinions on the subject,

"I remain, yours obediently,

"J. O. Westwood, Esq." "Wm. Atkinson, F.L.S., &c."

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The specimen sent was the shrivelled larva of a small Lepidopterous insect, apparently that of Oinophila v-flava.

Mr. F. Smith read the following note, entitled "Observations on a Paper by G. Newport, Esq., F.R.S., 'On the Anatomy and Development of certain Chalcididæ and Ichneumonidæ, compared with their special Economy and Instincts; with Descriptions of a new Genus of Bee-parasites,' in the 'Transactions of the Linnean Society,' vol. xxi. part 1."

"In Mr. Newport's excellent and highly interesting paper on bee-parasites, just published in the 'Transactions of the Linnean Society,' I observe some remarks on a communication of my own to that Society; and I am anxious to correct one or two inaccuracies. The first is the date of capture given in the communication referred to. I stated that it was the summer of 1848, it should have been 1847, as I learn by the date in Mr. Newport's paper; this is proved by a reference to my letter, in which I stated that I had placed specimens of Monodontomerus in the hands of Mr. Walker, for description, previously to having ascertained that Mr. Newport's insects were developed, although from time to time we had compared notes respecting the progress of each of our captures.

"Two localities are also established for the parasites,—Charlton and Gravesend,—since it was at the former where I obtained my larva of Anthophora, not at Gravesend, as stated by Mr. Newport, although I had been acquainted with the latter locality for fourteen or fifteen years, and had the pleasure of making it known to Mr. Newport.

"On reading the report of the meeting of the Linnean Society, March 20, 1849, I found it stated that the larvæ of Monodontomerus were pollinivorous; and when I took into consideration Mr. Newport's undoubtedly correct view, that 'structure, when carefully and accurately investigated, is an infallible index to function and habit:' and also, that the very announcement of such a discovery as that of an insect belonging to the family Chalcididæ being a feeder on pollen, was contrary to all hitherto recorded observation, I naturally concluded it to be a subject of the highest importance, and took the first opportunity of recording my own observations, which proved that Monodontomerus was, like its congeners, carnivorous; a fact which appeared to me calculated to invalidate the author's own views of the necessary connexion between structure and habit.

"I find at p. 67 of the 'Transactions' the following remarks:—'It was a question with me whether the bee-larva had not been killed by the other larva piercing it, and abstracting all its fluids from without? This query then seemed to be answered by the circumstance that the number of parasites was disproportioned to the size of the victim, which, had it served for food for them, would in all probability have been entirely consumed;' 'instead of which it contained the dried-up ligament and head of the young bee, which seemed to have been starved.' This being quite at variance with my own recorded observations, I would beg to recall to mind the circumstance that I observed the parasitic larvæ feeding upon the *pupa*, and not on the *larva* of the bee, which they continued to do until not a vestige of it remained; all that the cell contained, besides the parasitic larva, being a small portion of yellow dust, or small granules; so that a very curious and interesting fact, if supported by further research, appears to result from our combined observations; namely, that these parasites prey indifferently upon either the larva or the pupa of the bee: and as no similar instance

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of parasitism, so far as I can ascertain, is upon record, I am anxious to call attention to the fact, since it appears to have escaped the notice of Mr. Newport."

The Secretary read a paper communicated by Mr. H. W. Bates, "On the Habits of the Coleopterous Megacephalæ of the Amazonian Region."

Mr. White observed that it would be well to inform collectors at the Cape of Good Hope of the facts now stated, for Platychile pallida, which occurred there, had a similar structure to these Megacephalæ, and probably similar habits.

Mr. Douglas read the following note, being the substance of an article in the Annales de la Société Entomologique de France,' 1851, p. 323, by M. le Colonel Goureau, entitled "Note pour servir à l'Histoire de la Sericoris antiquana, *Dup.*"

"In the neighbourhood of Cherbourg, the farmers give the name of 'the hermit' to a larva which is found in the roots of Stachys arvensis, into which it bores a longitudinal gallery, acquiring at the same time food and shelter. Usually there is only one larva in a root, but sometimes two are found, at some distance from each other.

"On the 1st of December, 1849, I first had an opportunity of examining the roots of Stachys arvensis. On cutting them longitudinally, I found some quite entire, some fistulous throughout, and others pierced with a gallery nearly cylindrical in form, extending almost the whole length of the root, and containing a larva which moved quickly, either forwards or backwards, to that part of its tube which was not opened. The larva of this moth is very sensitive to the air and light, and when the end of its habitation has been cut off, it immediately closes the aperture with a silken covering.

"On the 21st of Feburary, 1850, and the 28th of May following, I examined fresh roots of Stachys arvensis, in which I found very few of these larvæ. Those of the latter date presented two round reddish spots, resembling slight bruises, on the seventh or eighth segment. To succeed in rearing these larvæ it is necessary to keep the roots in damp earth, or they will wither, and the larvæ perish. They change to pupæ within their gallery, and the moth appears at the beginning of July.

"Sericoris antiquana, *Dup.*
"Orthotænia antiquana, *Guén.*

"Larva.—Cylindrical, of an uniform livid white; head chestnut-brown, the jaws and labrum blackish brown; some hairs on the head and segments of the body; legs white."

The President read a Memoir on some new Lamellicorn Coleoptera, supplementary to his Memoir on the family published in the 4th volume of the Society's 'Transactions.'

The Secretary read the following letter: —

"Colegio del Espiritu Santo,
"Bogotà, Nueva Granada,
"April 1, 1852.

"Sir,

"I forwarded to you a butterfly a few days ago, for the Society. It is considered rare in this country, and it occurred to me that your Museum might not contain a specimen. I suppose it is of the genus Morpho.

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"I am considering the best and easiest method of preserving wood from the attacks of Termites. I should imagine that Kyan's or Bethell's process would succeed, and am not aware that either has been used for such purpose. Truly grateful should I be to any Member of the Society who would give me an opinion on this subject.

"I am, Sir, yours obediently,

"THOMAS JONES STEVENS.

"P.S.—I forgot to say that the specimen comes from Muzo, mean temperature in the shade 75°."

"The Secretary of the Entomological Society."

Mr. S. Stevens read the following extract of a letter, addressed to himself, from George Bush, Esq., dated "Orillia, Canada West, February 18, 1852:"—

"I know that you take great interest in anything relating to the capture of moths, and I have found out some new methods which may be of use to you. In summer I let some dirty soap-suds stand for a few hours, and exposed to our powerful sun they soon become offensive. In the evening I take any old pieces of rag, dip them in the liquid, and then hang them on the trees; the moths soon find them out, and no matter how many trees and flowers are in bloom, I have still many moths come to my cloths. I have even placed them near a large bed of the most fragrant flower in Canada (*Asclepias Syriaca*), and still had my share of moths. The Geometrinæ moths and many of the Nocturna are extremely fond of the fermented soap. This plan may not succeed in England; perhaps the weather is not sufficiently hot, and the English Lepidoptera may be more refined in their tastes. I have frequently seen butterflies here on dead fish, &c. The plan I have just mentioned is even more successful here than sugar in England; I think I have seen as many as seventy moths on a surface of 18 inches square, on a favourable night. I have tried sugar at different times without any success. The moths will come to the sap of the sugar-maple tree, but that will only run when the nights are frosty, so that very few species are in season at that time of the year. I think in England, by having a very brilliant light in the woods, you might capture a great many moths. I use for that purpose the birch-bark, which gives an intense light."

Mr. Stevens said he had tried the soap-suds once without success; but he thought they were not sufficiently putrid.

Part 1, vol. ii., n. s., of the Society's 'Transactions' was announced as just ready.

July 5, 1852.

J. O. WESTWOOD, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—'The Zoologist' for July; by the Editor. 'The Literary Gazette' for June; by the Publishers. 'Transactions of the Linnean Society,' vol. xxi., part 1:

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'Proceedings of the Linnean Society,' 1851, Nos. 45, 46, 47: 'List of the Linnean Society,' 1851; all by the Society. 'Exotic Butterflies,' by W. C. Hewitson, part 3; by W. W. Saunders, Esq. 'Entomologische Zeitung,' May and June; by the Entomological Society of Stettin. 'Ueber die Lebenswiese der Termiten und ihre Berbreitung,' von Dr. H. Hagen; by the Author. 'Bericht über die wissenchaftlichen Leistungen im Gebiete der Entomologie während des Jahres 1849,' von Dr. H. Schaum. Berlin, 1851; by the Author. 'Proceedings of the Royal Society,' vol. vi. No. 87; by the Society. 'Ædes Hartwellianæ, or Notices of the Manor and Mansion of Hartwell,' by Captain W. H. Smyth, R.N., F.R.S., &c. London, 1851; presented by Capt. Smyth and Dr. Lee, F.R.S., &c. 'A List of the British Aculeate Hymenoptera;' by S. Bagster, Esq. 'The Athenæum,' for June; by the Editor. A fine specimen of Lucanus Cervus, brought from the Pyrenees by W. D. West, Esq.; by D. W. Mitchell, Esq., Sec. Z.S. Bred specimens of Halias clorana; by A. F. Sheppard, Esq. Two specimens of Diglossa mersa, taken on the 26th of June, on the coast at Baldoyle, near Dublin; presented by the captor, A. R. Hogan, Esq. Cocoons of silk from the north of China, and specimens of Apate Bambusæ, *Spence, MSS.*; by Mr. Douglas.

Henry Haselden, Esq., 25, Whitehead's Grove, Chelsea, was elected a Subscriber to the Society.

Mr. E. W. Janson, on the part of A. R. Hogan, Esq., exhibited a Lepidopterous larva, from the segments of which proceed several elongate fungus-like excrescences, and concerning which Mr. Hogan communicates the following: —

"All the account I can give you of this singular creature is, that having found it some time last winter (in January, I think) when I was busily engaged with other matters, without identification or examination I threw it into a chrysalis-box which contained both moss and clay; in the former of these it disappeared, and I saw nothing more of it, till on preparing to start for England in May last, I cleared out the box, and found it dead, precisely in the state you will now see."

Mr. Douglas exhibited a bamboo fan, one of a case-full imported from China two or three years since, and all of which were now found to be eaten through and through by Apate Bambusæ.

The Secretary announced that the annual field-day meeting of the Society was held at Mickleham on the 26th of June; when captures of several rare insects were made, some of which he exhibited.

Mr. Douglas exhibited the curious larva-case of Tinea prælatella, found by him on April 9th, at West Wickham Wood, the larva feeding on Geum urbanum. He also exhibited specimens of a new Lithocolletis, which he proposed to call L. Scabiosella, having found the larvæ mining the radical leaves of Scabiosa Columbaria, growing at the side of the old tram-road beyond Croydon.

Mr. F. Grant exhibited Diphthera Orion, recently captured by sugar in the New Forest; also specimens of the rare Coleophora solitariella, *Zell.*, bred from Stellaria holostea, and C. albitarsella, bred from Glechoma hederacea.

Mr. S. Stevens exhibited a living larva, in its case, of the rare Coleophora conspicuella, taken at Headley Lane, on Centaurea nigra? It was black, shining, and in shape like the case of C. albitarsella, but double the size. He also exhibited a speci-

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men of the rare Pachetra leucophæa, taken flying on Mickleham Downs two days previously.

Mr. C. S. Gregson exhibited a number of Lepidoptera taken in the north of England; among them were Ceratopacha fluctuosa, Macaria notata, a new species of Tineidæ, and some beautiful specimens of Crymodes Templi, found among heaps of iron-stone, where they sheltered during winter, and where they were found on removing the lumps, between the months of October and February.

The President, on the part of Mr. Spence, read the following extract of a letter from G. H. K. Thwaites, Esq., dated "Peradenia, Ceylon, May 7, 1852:"—

"Last night, while I was sitting with all my windows and doors open, to enjoy the coolness during a shower of rain, a Paussus flew upon my white coat, and to my surprise, when I laid hold of him, he crepitated slightly, and there was an evident sensation of heat felt by me. The odour given off was most pungent and ammoniacal, and made my eyes water when he was brought close to them. I inclose a mutilated specimen of the same species of Paussus, which I found on the floor a short time ago, so that Mr. Westwood will be able to identify the species."

The species referred to is Cerapterus Westermannii.

The Secretary read the following note:—

"The 'Milan Gazette' of the 18th of June states that 'a woman named Theresa Ramos has discovered and proved by actual practice, that the plant *centinode** is quite as good nourishment for silkworms as the mulberry-leaf, and that by its means she had reared them in sixteen days only. It appears, however, that silkworms which have already tasted of the mulberry-leaf will not take to the *centinode*.'"

The Secretary read the following letter from E. L. Layard, Esq., Corresponding M.E.S.

"Jaffna, North Ceylon, April 26, 1852.

"Dear Sir,

"In looking over the 'Athenæum' of the 21st of February last, I see a notice of a Bostrichus penetrating the bamboo, and Mr. Curtis's remark that that wood was considered not to be liable to the attacks of insects. I presume Mr. Curtis meant *English insects*, as in Ceylon it has many enemies, some, I fancy, peculiar to itself. The *outside* of this, and many others of its tribe, is however when old so hard and polished that it is seldom touched, except when perforated for the purpose of affording escape to the mature fly, whose imago has fed on the soft parts within. I have often been deceived by the appearance of a fine stout bamboo or cane, and on taking it into my hand its lightness, and a little pressure, has quickly shown me a mass of fine dust encased in a thin coating of the outside.

"I am no Coleopterist, but I know enough to recognize the beetles which cause this mischief as belonging to the weevil family; and, if I mistake not, there is a saw-fly which causes the same damage.

---

* A species of Polygonum.

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"And as to *white ants!* — they revel in a bamboo fence. The hollow tubes are so many banqueting galleries; and not content with rooms many hundred times their own length, they throw down the partition walls, and use the whole *en suite*. I speak feelingly on this point, as a fence, not fifty yards long, which I am putting up, is not finished at one end, and the Termites have begun at the other. Last night's rain has brought them out in force: I feared it would, as my table was covered with winged females, which flocked in to the lamp. By the way, how many species are there of this genus? We have a black variety, *very rare*, thank goodness! and I certainly have seen three if not four varieties of winged females.

"I am, dear Sir,

"Yours faithfully,

"Edgar L. Layard."

"The Secretary of the Entomological Society."

Mr. S. J. Wilkinson exhibited a specimen of Elachista albifrontella, which he had reared from a naked pupa, found suspended head downwards near the bottom of a fence. He likewise exhibited specimens of Oinophila v-flava, bred from cases taken on the wall of a wine-cellar. The larvæ of this species were reputed to feed on wine-corks; but these cases were formed of the black fungus common in old wine-cellars, and Mr. Wilkinson thought that the larvæ had in this instance fed upon the fungus, for though there was a quantity of bottled wine in the cellar, there were none of these insects on the corks or near them.

Some very interesting observations on the habits of several insects, by William Varney, Esq., were read.

Descriptions of various new Hymenoptera from Northern India, by Mr. F. Smith, were read.

Mr. Douglas read a paper entitled "Contributions towards the Natural History of British Micro-Lepidoptera," in which the larvæ and their habits of the following species were described: — Gelechia contigua, G. fraternella, G. blandella, Coleophora albitarsella, C. Alcyonipennella, and C. solitariella. Two plates of illustrative figures by Mr. Wing accompany the paper. It was intimated that descriptions and figures of other species would follow from time to time, and Mr. Douglas requested collectors to send him any larvæ of Tineidæ they may find, with the names of the plants on which they feed.

August 2, 1852.

J. O. Westwood, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors: — Professor Zetterstedt's 'Diptera Scandinaviæ disposita et descripta,' 11 vols. 8vo.; by the Author. 'The Zoologist' for August; by the Editor. 'The Literary Gazette' for July; by the Publishers. 'The Athenæum' for May; by the Editor. 'Revue et Magasin de Zoologie,' Nos. 4 and 5, 1852; by M. Guérin-Méneville. 'Entomologische Zeitung' for July; by the Entomological Society of Stettin. 'Annals

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of the Lyceum of Natural History of New York,' Vol. v. No. 2; by the Lyceum. 'Life of the Rev. W. Kirby, M.A., F.R.S., F.L.S., &c.,' by the Rev. John Freeman, M.A.; by the Author. 'Insecta Saundersiana. — Diptera,' part 3; by W. W. Saunders, Esq.

The President also announced, that Miss Bromfield, of Ryde, had presented to the Society the whole of the entomological library, containing many rare and costly books, the collection of insects, and the cabinet, of her late brother, Dr. William Arnold Bromfield; for this munificent gift the Society passed a special vote of thanks.

The following is a list of the books presented: —

Admiral, Lepidopterous Insects, folio, 1774.
Albin, Historia Insectorum Angliæ, 4to. 1731.
„ Ditto, English edition.
„ History of Spiders, 4to. 1736.
Cederholm, Fauna Ingrica Prodr. (Insecta), 8vo.
Clerck, Aranei Suecica, 4to. 1757.
Cramer, Papillons Exotiques, et Suppl., 5 vols. 4to., coloured.
Curtis, British Entomology, royal 8vo., 16 vols. in 8.
Cyrilli, Entomol. Neapol. Spec., 8 plates.
Denis und Schiffermuller, Syst. Verz. der Schmetterlinge, 4to. 1776.
De Geer, Genera et Species Insectorum.
„ Mémoires pour servir à l'Histoire des Insectes, 7 vols. 4to.
Donovan, British Insects, 8vo., 16 vols. in 8.
Drury, Insects, 3 vols. 4to.
„ Illustrations of Natural History, 4to., 3 vols. in 1.
Entomological Magazine, 5 vols.
Erichson, Die Käfer der Mark Brandenburg, 1 Band, 1—2 Abth.
Fabricius, O., Fauna Grœnlandica, 8vo. 1780.
Fabricius, Entomologiæ Systema et Suppl., 5 vols. 8vo.
„ Genera Insectorum, 8vo.
„ Entomol. Philosoph. 8vo.
„ Mantissa Insectorum, 2 vols. 8vo.
Frisch, Beschreibung von Allest. Insecten in Deutschland, 1 vol. 4to.
Fuessly, Verz. der Schweitz Insect.
„ Archives des Insectes.
„ Nues Magaz. der Liebhabe, 2 vols. 8vo.
Geoffroy, Histoire Naturelle des Insectes de Paris, 2 vols. 4to.
Goedart, Metamorph. &c. Insectorum, 12mo.
Gyllenhal, Insecta Suecica, 4 vols.
Harris, Exposition of English Insects, 4to.
„ Aurelian, folio, 1778.
„ Treatise on American Insects, royal 8vo.
Haworth, Lepidoptera Britannica, 8vo.
Horsfield and MacLeay, Annulosa Javanica, 4to.
Kirby, Monographia Apum Angliæ, 2 vols.
„ Fauna Boreali-Americana, 4 vols. 4to.
Kirby and Spence, Introduction to Entomology, 4 vols. 8vo.
Latreille, Genera Crustaceorum et Insectorum, 4 vols. 8vo. 1806.
„ Considerations Générales, 8vo.

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Lewin, Prodr. Entomol. (Lepidopt. N. S. Wales).
Lyonnet, Œuvres Anatomiques.
„ Recherches, &c.
Magazin der Entomologie, 2 vols. 8vo.
Meigen, Europaische Schmetterl., 3 vols.
Merian, Insects of Surinam, folio.
„ Histoire des Insectes de l'Europe.
Mouffet, Theatrum Insectorum, 1634, 2 copies.
Percheron, Bibliographia Entomologica, 2 vols. square 8vo.
Ray, Historia Insectorum, 4to. 1710.
Reaumur, Mémoire des Insectes, 6 vols. 4to.
Roemer, Genera Insectorum, 4to. 1789.
Roesel, Insect. Belust. 4 vol. 4to.
Rossi, Mantissa Insectorum, 4to.
Samouelle, Entomologist's Compendium, 8vo. 1819.
Say, American Entomology, 3 vols. 8vo.
Schaffer, Icones Insectorum, 4to. coloured.
Scopoli, Entomologia Carniolica, 2 copies.
Sepp, Histoire Naturelle des Insectes de Surinam, 3 parts.
Smith, American Insects, 2 vols. folio.
Stephens, Illustrations of British Entomology, 12 vols.
„ Systematic Catalogue of British Insects, 8vo.
„ Manual of British Beetles.
Stoll, Punaises, 4to., 1788.
„ Cigæses, 4to., 1788.
Wilkes, English Butterflies and Moths, 4to.
Wood, Index Entomologicus, 2 copies.
Zetterstedt, Insecta Lapponica, 4to.

Mr. S. Stevens exhibited Graphiphora ditrapezium, reared from a larva found at Leith Hill, Surrey.

The President exhibited two curious instances of monstrosity in the hive-bee, one in a male having the left antenna, terminated at the end of the first joint by a knob, and the right hind-foot having a small round plate instead of the usual process; and the other example being a queen, in which one of the fore-pair of legs was exceedingly short.

Mr. F. Smith exhibited specimens of Œcophora lacteella, bred from corks of wine-bottles by Mr. Felkin, and also reared by himself from nests of Bombus Raiellus, in which the larvæ fed upon the wax. He also exhibited Bombus nivalis, *Zett.*, a new British species, taken in Shetland by Mr. John White; and Pompilus variegatus, taken by himself last month near Wakefield, where the females were plentiful, but only one male was captured. He likewise exhibited Batrisus venustus, one of the rarer Pselaphidæ, taken in the nest of Myrmica rubra.

Mr. F. Grant exhibited several specimens of Hypera tigrina, a new British species of Curculionidæ, bred from wild carrot last July; specimens of Coleophora Onosmella, found on Echium vulgare, and Sciaphila Perterana reared from larvæ on heads of groundsel; all found near Dover last month: likewise Coleophora Hemerobiella, from larvæ found on pear trees at Putney.

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Mr. Wing exhibited part of a French wine-case, perforated by galleries of larvæ, probably of Cossus ligniperda.

Mr. Waring exhibited specimens of Crambus uliginosellus from Farnham, Penthina Capræana, bred from sallow from West Wickham, and Tortrix Viburnana.

The President read descriptions of three new species of Paussidæ, from the collection of Herr Dohrn, President of the Entomological Society of Stettin.

Mr. F. Smith read some 'Notes on the Development of Osmia parietina, and other British Insects.'

The Secretary read the conclusion of Mr. Wm. Varney's paper on the habits of various insects.

September 6, 1852.

J. O. Westwood, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors: — 'The Zoologist' for September: by the Editor. 'The Literary Gazette' for August; by the Publishers. 'Notizie relative ad Insetti Coleotteri dannosi ed alcuni ospitanti della planta del Fico; da Carlo Passerini:' by the Author. 'Abhandlungen der Mathemat.-Physikalischen Classe der Koeniglich Bayerischen Akademie der Wissenchaften;' 6 Bandes, 2 Abth.: Munchen, 1851. 'Bulletin,' ditto, No. 34—43: by the Academy. 'Annals of the Lyceum of Natural History, New York,' Vol. v., parts 7 and 8, 1852; by the Lyceum. 'Journal of the Royal Agricultural Society of England,' Vol. xiii., part 1; by the Society. 'Smithsonian Contributions to Knowledge,' Vols. iii. and iv., Washington, 1852: 'Fifth Annual Report of the Board of Regents of the Smithsonian Institution,' 1851: 'Report on Recent Improvements in the Chemical Arts,' by Booth and Morfit: 'Directions for Collecting Specimens of Natural History:' 'Abstract of the Seventh Census of the United States:' 'American Zoological, Botanical, and Geological Biography for 1851,' by Charles Girard; all presented by the Smithsonian Institution. A box of insects of several orders; by Signor Passerini of Florence, Hon. M.E.S. A box of Coleoptera from the Isle of Wight; by George Guyon, Esq. Two pairs of Boarmia Abietaria, bred specimens; by the Rev. Joseph Greene. A specimen of Hydrelia Blomeri; by Mr. Shield. Four bred specimens of Ypsipetes Ruberaria, *Freyer*, a new British species; by Mr. Bond.

Thomas Jones Stevens, Esq., Bogotà, was elected a Corresponding Member, and Thomas Boyd, Esq., 17, Clapton Square, was elected an Ordinary Member of the Society.

Mr. Bond exhibited a box of Coleoptera from the Mundarra River, 400 miles N. of Sydney, among which were several new and interesting species, including a curious cylindrical Scarites and two species of Cerapterus.

Mr. S. Stevens exhibited some splendid males and females of Callithea Sapphira, bred in Brazil by Mr. Bates. The President stated that larvæ and pupæ of this spe-

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cies had been received from Mr. Bates, and would shortly form the subject of a paper for this Society.

Mr. Moore exhibited several curious parasitic insects obtained from the great ant-eater (*Myrmecophaga jubata*), the gland antelope of Africa (*Antilope Oreas*), and the ostrich, in the late Knowsley Menagerie; and he also showed some immature specimens of a foreign Polistes, which had been drawn out of their cells.

Mr. Douglas exhibited a box of Lepidoptera, captured in July near Ripley, among which were two of Plutella horridella, taken among apple-trees in a garden at Ockham, and Gelechia basaltinella, out of the old thatch of a barn. He likewise exhibited specimens of the rare and curious Bedellia somnulentella, bred from larvæ found at Lee, mining the leaves of Convolvulus arvensis; also examples of the second brood of the new Lithocolletis Scabiosella.

Mr. Weir exhibited some rare Lepidoptera recently taken near Tunbridge Wells—Gracillaria Ononidis from Genista tinctoria, Gelechia gerronella, Zelleria insignipennella, Adela violella? &c.

Mr. A. F. Sheppard exhibited several fine Lepidoptera, taken near Margate in August,—Colias Hyale, Eudorea lineolea, Œcophora deauratella, &c.

Dr. Dutton exhibited some Noctuæ, caught in the Isle of Wight, the most remarkable being the sexes of the rare Agrotis lunigera.

Mr. E. Shepherd exhibited a fine specimen of Chilo cicatricellus, a new British species, taken flying near Dover; also two new species of British Tortrices, from the same locality.

Mr. Curtis exhibited a specimen of Sphinx Antæus, bred in the Horticultural Society's Gardens, from a pupa imported with plants from Trinidad, and remarked upon the caution with which we should regard as native all the extraordinary insects which appear in this country. He referred especially to such as were captured at light-houses on the coast, of which he adduced some examples, having no doubt that most of the rare or unique species taken in this way, had come across the sea.

Mr. Curtis exhibited a leaf of Viburnum Lantana, on which were many scale-like formations, which he supposed were the work of an insect, although he had failed in detecting any inmates.

Mr. Wilkinson exhibited some case-bearing larvæ, probably of Incurvaria masculella. The cases were oval and convex, formed from leaves, and the larvæ were found feeding on the fallen leaves of oak and birch, but they had eaten fresh leaves since their capture.

The President read an extract of a letter addressed by Signor Passerini of Florence, to Mr. Spence, stating that he would be happy to send Coleoptera, Hymenoptera, and Lepidoptera of Tuscany, to any English entomologists who would apply to him, which he invited them to do by post, and that he wished to receive in return examples of English species of those orders.

The President stated that lately at Boulogne he found the edge of the cliff swarming with insects of all orders, although none were visible elsewhere. The wind was blowing seaward, and the insects had been driven over the cliff, and had returned and sheltered at the margin. He also said that at the same time and place he saw a humble bee vibrating its wings as if in flight, but not advancing, and he found that it was impaled upon the sharp point of a reed, pierced at its almost only vulnerable point, between the anterior coxæ and the mesosternum; from its position he thought no bird could have impaled it, but that it had been blown on to the reed by the wind.

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Mr. Desvignes said that he had a Noctua found transfixed by a thorn, and he was satisfied, from its being in perfect condition, that no bird had ever touched it.

Mr. Curtis and Mr. Bond however were of opinion that the majority of insects found impaled, had been so fixed by birds; and Mr. Waring said he had repeatedly found the nests of shrikes, guided by the birds and insects hung up in their vicinity.

Mr. Curtis said that at Dover he had lately seen Scæva Pyrastri in vast abundance, and he was convinced that S. unicolor is only a variety thereof: he was unable, however, to find a male of this striking variety, and would be glad to learn if any existed in the London cabinets. He observed that the males of insects seemed to vary far less than the females, and it often struck him as remarkable that whilst pale varieties of the females of Colias Edusa were not uncommon, a similar variety of the male should be unknown. When in the South of France, in 1830, he caught a pair of C. Edusa flying *in copulâ;* the male was of the usual orange colour, the female pale yellow, the C. Helice of Hübner.

The Secretary read the following notes on the larvæ of a few Micro-Lepidoptera, extracted from the 'Tauschvereins Bericht,' 1848—50, just received.

"Myelois epelydella is a rarity. One of my friends discovered the larvæ in tubular cocoons on blackthorn.

"Phycidæa binævella. The larva lives in autumn in the flowers of the ragwort, (*Senecio Jacobæa*); it is, however, difficult to rear.

"Micropteryx Anderschella appears with us in spring, when it often swarms in the sunshine on the young shoots of the oak. The larva appears to live as a miner in the leaves of that tree.

"Depressaria emeritella. We find the larvæ at the end of July on tansy (*Tanacetum vulgare*), where it lives between united leaves. In seeking for it, one needs to go carefully to work, as on the approach of any danger it hastily descends to the earth.

"Opostega Laburnella. The food-plant of the larva is the laburnum, (*Cytisus Laburnum*). Where the larva occurs it is generally plentiful; but it is best to collect the pupæ in autumn.

"Hypsolophus limosellus, *Martini*, n. sp. In size and form this new species closely resembles Hyps. fasciellus. The anterior wings are narrow, and in form quite the same as in Hyps. fasciellus. The ground-colour is yellowish brown, and before the hinder margin it becomes a nut-brown, which colour is produced by an aggregation of darker atoms. On the costa of the anterior wings, from next the base to the end of the curve, is a narrow, sooty, black-brown streak. On the disk, half way across, three dark brown spots in a straight line may be seen in distinctly marked specimens; the first is near the base, the second in the middle of the wing, and the third before the hinder margin. Under the first and second, but more towards the second, near the inner margin, lies a similar spot, and under the third another, somewhat directed towards the base, and yet it also appears united to the third spot. One or other or all the spots except the third are often wanting. The larva feeds in tubularly united leaves of several low plants. I found it on Fragaria vesca, F. collina, several species of Trifolium and Scabiosa arvensis, but hitherto only on an open place in a wood. It changed to a pupa in its abode: the imago appears in July.

"Depressaria Libanotidella, *Martini*. Size and form of D. Heracleana, which it otherwise much resembles; the size is variable, as specimens occur as small as D. Pimpinellæ. The larva lives, in July and August, in the umbels of Athamanta Libanotis (*Libanotis montana*), on the mountains and in woods near Jena. When young,

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and before the flowers expand, it lives between tubularly united leaves; it afterwards draws the flowers together. The perfect insect appears from the end of August to the end of September.

"Ypsolophus Schmidtiellus, *V. Heyden*. Size of Grapholitha Hypericana. The long, narrow, anterior wings are orange-coloured, darker towards the hinder margin, with a small dark spot in the middle of the wing, and a larger dark spot near the inner margin towards the base. Cilia of the same colour as the wings, preceded by a fine row of dark spots. The larva we find in May on Origanum vulgare, where it betrays itself by the curved leaves. On any alarm it hastily retreats to the earth. The imago appears at the end of June."

Ypsolophus Schmidtiellus (first described in the 'Isis,' 1848) can hardly be the Durdhamellus, yet Origanum would be a likely food for that species.

With regard to Depressaria Libanotidella, its food-plant is British, but rare, occurring on the chalk hills of Cambridgeshire. I find it in Sowerby as Seseli Libanotis, and in Babington as Libanotis montana.

Part 2 Vol. ii. n. s. of the 'Transactions' was on the table.

The meetings of the Society will in future be held at 12, Bedford Row; to which the Society will immediately remove.

October 4, 1852.

J. O. Westwood, Esq., President, in the chair.

Since the last meeting the Society has removed from No. 17, Old Bond Street, to more eligible apartments at No. 12, Bedford Row; but the painting of the meeting-room not being completed, the Zoological Society kindly permitted this meeting to be held at their house in Hanover Square, for which favour the members passed a vote of thanks.

Mr. Wallace was present as a visitor. He has lost the whole of the valuable collections of Natural History, made by him during several years' residence in South America, by the burning at sea of the ship in which he was bringing them to this country, and he narrowly escaped death in an open boat, from which, after long privation and suspense, and while yet in the midst of the Atlantic Ocean, he and others were taken up by a vessel bound to London.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' and the 'Phytologist' for October; by the Editor. 'The Literary Gazette' for September; by the Publishers. 'Revue et Magasin de Zoologie,' 1852, Nos. 6 and 7; by M. Guérin-Méneville. 'The Athenæum' for August and September; by the Editor. Hewitson's 'Exotic Butterflies,' part 4: by W. W. Saunders, Esq. Dr. C. G. Nees ab Esenbeck's 'Hymenopterorum Ichneumonibus affinium Monographiæ,' vol. ii.; by Mr. Baly. 'Mémoires de la Société de Physique et d' Histoire Naturelle de Genève,' tome xiii., 1re partie: Genève, 1852; by the Society. Eight specimens of Haltica pubescens, taken in August, at Holme, near

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Peterborough; by the captor, the Rev. Hamlet Clark. Also, the following books, by Miss Eliza Bromfield, in addition to her former donation: —

Linnæi, Fauna Suecica, 8vo.

„ Museum Ulricæ, 8vo.

Raupen Kalender Naturgeschicte, &c., 8vo.

Rossi, Fauna Etrusca, 2 vols. 4to.

Swammerdamm, Biblia Naturæ, 2 vols. folio.

Vogel, Verhandlungen der Insecten, 8vo.

J. C. Pickersgill, Esq., 36, Gordon Square, was elected a Member; and C. W. Quin, Esq., 25, Clarence Street, Islington, and Mr. R. Shield, Dublin, were elected Subscribers to the Society.

Mr. C. R. Bree sent for identification a larva of Anthrenus Museorum, found alive in his cabinet. He complained of the difficulty experienced by persons in the country in identifying the insects they found; and suggested that for the benefit of a very numerous class, who were not exactly students, but who nevertheless wished to be better acquainted with the insects around them, it would be very desirable that monographs of our native insects should be published in annual volumes, with a figure of each species;—a work he thought it possible might be accomplished.

Mr. Bond exhibited some larvæ of Anticlea Berberata, feeding upon the leaves of berberry, from Cambridgeshire. He observed that like these now exhibited, the colour was usually brown, but sometimes it was luteous, in specimens of the same age.

Mr. Weir exhibited specimens of Coleophora deauratella, taken among clover near Tunbridge Wells; and one of the rare Elachista trapeziella from the same locality.

Mr. Edwin Shepherd exhibited a box of Lepidoptera taken by Mr. Bouchard near Dover, in July. The following were the most remarkable species: — Plusia Orichalcea, Spælotis Cataleuca, Odontia dentalis, Emmelesia bifasciata, Stigmonota Leplastriana, Semasia rufillana, Depressaria nanatella, Gelechia bifractella, G. neuropterella, Ypsolophus Durdhamellus and Adela violella: also a Vanessa Antiopa, and pale varieties of Satyrus Janira and S. Semele, taken in the same locality in September.

Mr. S. Stevens exhibited a Vanessa Antiopa, taken on the 24th of September at Hampstead.

Mr. Bond mentioned that he saw a Vanessa Antiopa flying in Cambridgeshire last month.

Mr. Hunter brought a number of Mononychus Pseudacori for distribution: he took them feeding on the seeds of Iris fœtidissima, in the Isle of Wight.

Mr. Hunter mentioned that Mr. Winchester, one of Her Majesty's gardeners at Cowes, had discovered a new method of using sugar as a bait for Noctuæ, by dipping pieces of coarse cloth in the solution, and spreading or hanging them on bushes, &c.; this was found especially convenient in places on the coast where there were no trees on which to place the mixture, and there was a great saving of sugar, for one preparation of the cloth would be effectual for a week, if the pieces were removed every night. Mr. Winchester had tried putrid soap-suds, after the manner mentioned at the June meeting of this Society, with some effect, but they did not seem more attractive than sugar.

Mr. Douglas exhibited specimens of Elachista testaceella, bred from larvæ found on Sison Amomum at Lewisham, observing that the larva, its food, and metamorphoses had been figured and described by De Geer about a century ago; and it was the discovery of this by Mr. Stainton that had led to its present detection. He also exhi-

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bited Rœslerstammia pygmæana, bred from larvæ mining in the leaves of Solanum Dulcamara, and a living larva *in situ*.

Mr. Shepherd said he had found the same kind of larvæ in the leaves of Atropa Belladonna.

Mr. Douglas read a paper "On the Identification of the Species of Micro-Lepidoptera whose Larvæ mine in Leaves, described and figured in the 'Mémoires' of De Geer and Reaumur," illustrated by living examples in the leaves of various plants. He also read, from Chambers' 'Edinburgh Journal,' the following account of the habits and manner of capturing the "Groo-groo" worm of the West Indies, now stated to be the larva of a Prionus, but mentioned by the Rev. F. W. Hope, in his paper on "Insects used as the Food of Man" (Trans. Ent. Soc. iii. 234), under the name of Calandra Palmarum.

"Among the variety of curious insects which are common to tropical climates, the groogroo worms of the West Indies may be considered particularly interesting. From the peculiar manner in which they are produced, and from the circumstance of their constituting a choice article of food for man, they become entitled to some attention.

"The groogroo worm—so called because it is found in a species of palm vulgarly called the groogroo—is the larva of a large-sized beetle, the Prionus, which is peculiar to the warm latitudes of America. With the exception of a slight similarity about the region of the head, the worm bears no resemblance to the parent beetle. When full-grown, it is about 3½ inches in length, having the body large and turgid, and increasing in circumference from the head towards the opposite extremity. The head is of a corneous, opaque substance. It has neither eyes nor the rudiments of the antennæ which distinguish the beetle tribe. It is, however, provided with the mandibles and other oral apparatus of the mandibulate group of insects, and it is only in this feature that any connexion with the beetle can be traced. The trunk is precisely that of a worm; it consists of many closely-knitted segments, which are possessed of an extraordinary contractile power. It bears no mark which would indicate a future metamorphosis into a beetle. There is no sign of a future division into thorax and abdomen. There are no rudiments of wings or feet, as the under surface of the body presents exactly the same appearances as the upper. At the posterior extremity of the worm, however, there is a small horny termination, something like the hinder part of the leech. The organs are exceedingly simple, the digestive being the most developed. Albumen is the substance which composes its body, and its blood is of a greenish tint. With a motion similar to that of the earthworm, it perforates with extraordinary rapidity into the substance of the tree in which it is found.

"When the moon is at her full, the gatherer of worms enters a neighbouring wood, and selects a young *palmiste* tree. This is a tree of the palm order, exceedingly stately and graceful, growing sometimes to the extraordinary height of eighty feet. From the roots upwards, it has not a single branch or shrubby excrescence, but grows beautifully smooth and straight, tapering towards the top. At its top, an abundance of the richest and most beautiful leaves spread out in graceful symmetry, and bend down on all sides, forming a figure like an umbrella; while the young leaf, still firm and compact in its foliar envelope, is seen standing erect in the centre of this foliage, like a lightning-conductor.

"When a promising palmiste is found, the gatherer makes an incision into it with

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a cutlass or a hatchet. This incision is generally in the figure of a half-moon, with the base of the semicircle downwards, and the wound increasing in depth in that direction, so as to expose effectually the flesh of the tree. When this is done, the gatherer marks the locality, and leaves the tree, which he does not revisit for a considerable time. When the moon is in her wane, he returns and examines his palmiste. If the young leaf, together with the others, begins to show a yellow tinge at its extremity, and if, on application of his ear to the trunk, a hollow, rumbling noise is heard within, he concludes that the worms have attacked the vital parts, and the tree is immediately cut down; but if these symptoms are absent, the tree is left standing until they appear. The gatherer, however, must now visit the tree frequently, because the transition of the insects is so rapid, that almost immediately after the appearance of the yellow tinge the whole would disappear. When the tree is felled, a square portion of the bark is cut out longitudinally from the original incision upwards, and its fibrous texture laid open. Myriads of worms are then seen voraciously devouring their way through the substance. In capturing them some degree of dexterity is necessary, both to protect one's self from the mandibles of the insects, which inflict a painful bite, and also to save time, by preventing them from burrowing out of sight. When the worms are taken, they are placed into a close vessel, where they continue to retain their activity and vigour.

"The number that can be procured from a single tree, depends altogether upon the season in which it is wounded. If the moon is at her full, they are generally numerous and good—many thousands being found in an ordinary young tree of 25 feet in height. If a few succeed in eluding the gatherer, they do so only to become a prey of as voracious animals, for the wild hogs, or *quencos*, of the forest relish much the soft substance of the palmiste when in a state of decomposition. It never happens, therefore, that much time passes before they discover any palmiste-tree that has been felled; and as soon as night sets in, they flock in numbers to the spot and devour the whole substance. A gathering of worms, therefore, brings a hunt of quencos; and the gatherer, when his first business is over, chooses a convenient tree, where he places himself in ambush. Seated on a cross branch, he awaits the coming of the animals.

"It is difficult to form an idea of the peculiar excitement of this midnight sport in the thick woods of a tropical country. The usual stillness of the night, and the solitude of the wilderness—the croaking of the night-birds, the movement of every leaf, animated as it is by the myriads of nocturnal insects that fill the atmosphere—the brilliant and fleeting fire-flies traversing the gloom—the strange animals wandering in their nightly prowlings—the approach of the grunting hogs, and the incidents of the hunt: all these things, combined with the idea of isolation when a man finds himself alone in the wilds of a scarcely pervious forest, create an inexpressible feeling of mingled fear, pleasure, and anxiety.

"Before the worms are cooked, they are, each in its turn, carefully pricked with an orange-thorn, and thrown into a vessel containing a sauce of lime-juice and salt. This is for the purpose of cleansing them from the viscid fluids they have imbibed from the palmiste. Notwithstanding this discipline, the worms retain their vitality till they are deprived of it by the culinary process. The simpler mode of dressing them is to spit a number together on a piece of stick or a long orange-thorn, and roast them before the fire in their own fat. The general mode, however, is by frying them with or without a sauce, and when dressed in this manner, they form a most savoury dish.

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"Groogroo worms are considered great delicacies in some parts of the West Indies, chiefly in those whose inhabitants are of French or Spanish origin. The good old planter at his table presents you with a dish of worms, with as much pride as an epicure in England introduces you to cod-sounds, eels, or high venison. Nor does it appear that there is any peculiarity in the taste of those who relish the insects; because it very frequently happens, that the stranger, who manifested on his arrival the greatest disgust at the idea of eating worms, becomes immediately converted into an extravagant lover of them.

"It may appear strange that in the tropics, especially, where Nature provides so abundantly for the wants of man, such creatures should be resorted to as articles of consumption; but while we on this side of the Atlantic are shocked at the idea of eating worms, the West Indian consumer in his turn expresses surprise that human beings can use things which resemble snakes so much as eels, and pronounces it to be the height of uncleanness to eat frogs, as some of the continentals do. Indeed, the groogroo worm is by no means more repulsive in appearance than any of the other unprepossessing creatures which are so highly prized. It would be a difficult matter to decide on the merits of the many extraordinary things which the taste of man, in its morbid cravings, has discovered and converted into luxurious use; and the philosopher finds himself at last driven to take shelter from his own unanswerable inquiries behind the concluding power of that most true, but somewhat musty proverb:—'De gustibus non est disputandum.'"

November 1, 1852.

J. O. Westwood, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—'The Zoologist' for November; by the Editor. 'The Athenæum' for October; by the Editor. 'The Literary Gazette' for October; by the Editor. 'Entomologische Zeitung' for August, September, and October; by the Entomological Society of Stettin. 'Annals of the Lyceum of Natural History of New York,' Vol. v. Nos. 4, 5, and 6; by the Lyceum. 'Monographie des Guêpes Solitaires, ou de la Tribe des Euméniens,' par H. F. de Saussure: cahier 2: Paris, 1852; by the Author. A lithograph portrait of Dr. J. E. Gray, framed and glazed; by Mr. F. Smith. Four specimens of Coremia erutaria, and two of Eidophasia Messingiella; by Mr. J. B. Hodgkinson. Two specimens of Hydræcia Petasitis; by Mr. N. Greening. A collection of British Anoplura, or bird-lice (named by Mr. Denny), three large store-boxes, and some miscellaneous insects; by the Rev. Leonard Jenyns. A series of illustrations of the natural history of Vespa Britannica; by Mr. F. Smith. A box containing sixty species of British spiders, preserved in spirit in small glass tubes; by Mr. R. H. Meade.

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A letter accompanied the last-mentioned donation, in which Mr. Meade says :—

"The species are arranged and named according to the catalogue recently published by Mr. Blackwall in the 'Annals and Magazine of Natural History.' The species are mostly very common, and my motive in sending them to the Society is not to present them with anything rare, but to show what I consider to be the best method of preserving specimens of this class of animals, which cannot, like true insects, be kept dry, without entirely losing their characteristic forms. When placed in small glass tubes, filled with spirit of wine and well corked, they may be preserved for any length of time, and, except for purposes of critical examination, may be sufficiently seen, without removal from the tube, for the purpose of determining the species."

Mr. Boyd exhibited a fine Vanessa Antiopa, and specimens of Luperina cespitis, Depressaria Carduella, D. rotundella, D. pallorella, and other species of Lepidoptera, recently captured in the Isle of Wight.

Major Sheppard exhibited a hermaphrodite Polyommatus Alexis, taken this year in Hainault Forest. The right side is male and the left female, as is usual in such cases.

Mr. Winter exhibited a fine Chœrocampa Nerii, taken at Brighton; a remarkable variety of Spilosoma Menthrasti, with very large black spots on the under wings; and a singularly pale variety of Oporabia dilutata.

Mr. Weaver exhibited a quantity of insects, taken by him this year in Perthshire. The Coleoptera included Hylecœtus dermestoides, Dircæa discolor, Dyctiopterus Aurora, Boletophagus crenicollis, Aphodius uliginosus, *Hardy*, A. Lapponum, Pytho depressus and Dendrophagus crenatus. Also Cetonia æneа, bred from larvæ which fed in ants' nests on the pupæ of the ants; the cocoons being covered with small bits of wood, and thus differing from those of C. aurata, which are formed entirely of earth. Among the Lepidoptera were Oporabia neglectaria, O. precursoria, O. autumnaria, O. proximaria, O. filigrammaria, Plemysia lapidata, Tinea Picarella, and Psyche opacella, var.? The different series of Oporabia under the above names Mr. Weaver believes to be distinct species, and that the Psyche he gets in Scotland is not P. opacella, which it most closely resembles, differing in the males being larger and having longer antennæ, and in the habits and formation of the cases of the larvæ.

Mr. F. Smith exhibited a series of illustrations of the natural history of the tree-wasp (*Vespa Britannica*), among which the President drew special attention to the fact that the larva makes a distinct case or cocoon within its cell.

Mr. Smith also exhibited various parasitic insects found in the nest of the same wasp.

Mr. Moore exhibited a walnut, in which he had found several Dipterous larvæ belonging to the family Muscidæ, some of which he had reared to the perfect state.

Mr. S. S. Saunders exhibited some Chalcididæ, parasitic in the nests of an Osmia, and some Dipterous parasites on a Pompilus. Also, a complete series of illustrations of the natural history of six species of Stylopidæ; all brought by him from Albania.

Mr. Edwin Shepherd exhibited a variety of Lepidoptera recently captured near Dover, including Agrotis saucia, Heliothis armigera, Hadena lutulenta, Spilodes sticticalis, Depressaria depressana, D. Pimpinellæ, and a new species of Gelechia allied to vilella.

Mr. Douglas exhibited the larvæ of several species of Nepticula, mining in leaves of various plants.

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The President exhibited a curious cottony formation from the body of the larva of a Sphinx, forwarded from China by Mr. J. C. Bowring. It consisted of the cocoons of a parasitic Eurytoma, and some of the perfect insects were left entangled.

The President also exhibited some of the plates of M. Emile Blanchard's new great work entitled 'L'Organisation du Règne Animal.'

Mr. Moore communicated the following extract from 'Allen's Indian Mail,' of October 5, 1852.

"*Gigantic Spiders.*—Captain Sherwill, in an expedition to the Kurrukpoor Hills, south of Monghyr, found upon the summit of Maruk, a table-topped hill of 1,100 feet elevation, several of the gigantic webs of the Epeira spider, some of which measured (including the guy-ropes) from 10 to 20 feet in diameter, the reticulated portion being about 5 feet, in the centre of which the spider, of a formidable size and very active, sits waiting for prey. 'The webs' he says 'from their great strength offered a sensible resistance when forcing our way through them; in the web of one of the spiders we found a bird entangled, and the young spiders, about eight in number, feeding upon the carcass. The bird was, with the exception of his legs and beak, entirely enveloped in web, and was much decomposed; the entwined web had completely pinioned the wings of the bird, so as to render his escape impossible. The bird was about the size of a field lark, and was near the centre of the web; the old spider was about a foot above the bird; we secured, measured and bottled him. Its dimensions were 6 inches across the legs, and it was armed with a formidable pair of mandibles."

Mr. Douglas read the following extract from the 'Literary Gazette':—

"M. Bazin, an eminent French agriculturist, has made observations in Picardy and Burgundy, which satisfy him that the potato-disease is caused by microscopic insects, which alight on the leaves in the night-time, and disappear almost instantaneously on the slightest alarm, into the earth. The depredations of these insects cover the leaves with yellow spots, which turn black afterwards; and the insects also attack the root. It has generally been assumed that the malady consisted in a fungus growing on the plants: but M. Bazin is convinced that the fungus is exclusively caused by the insects. These same insects, it appears, have begun to attack melons."

The following remarks on the "fly-blight" in Australia, by Mr. Spence, were read:—

"In a review in the September number of 'Blackwood's Magazine' (p. 309), of Col. Moody's 'Our Antipodes,' containing an account of his travels in Australia, mention is made of a disease in the human eye, called the 'fly-blight,' attended with acute inflammation and temporary loss of sight, and caused by some species of fly. These insects, Col. Moody observes, 'are the common fly, harmless in Europe. The blight is occasioned either by their bite, or the deposition of their larvæ, and is most disastrous to working men.' And he then goes on to observe, 'Mr. Icely's [a gentleman he was visiting] daughters invented the "Fitzroy-Paramouche," a net to hang from the hat over the face, and although the meshes were large not to obstruct the air, the flies ventured not within.'

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"To two points in this extract I beg to call the attention of the Entomological Society.

"The first is, as to the desirableness of ascertaining what is the species of fly which causes the 'fly-blight.' Col. Moody is no doubt in error in supposing it to be the 'common fly,' if by this term he means our house-fly, (*Musca domestica*); and a great service would be rendered to the science, if any members of the Society who may have friends in those parts of Australia where the fly-blight prevails, would request them to send three or four specimens of the fly that causes the disease, which might be done with small trouble, by killing them by means of slight pressure, and gumming them on a piece of paper inclosed in a letter.

"The second point is as to the remarkabe confirmation which the ingenious and valuable invention by the Misses Icely of the 'Fitzroy-Paramouche' affords of the efficacy of the Italian plan of excluding flies from rooms by nets with wide meshes, which I brought to the notice of our Society eighteen years ago (Trans. Ent. Soc. i. 1), and which the late lamented Bishop of Norwich found so effectual (Id. ii. 55), when extended to protecting the face from them, merely by suspending a net from the hat; and also as to the probability which thence arises, that a similar contrivance might keep off gnats (*Culices*) from the faces of travellers in districts much exposed to them. This struck me long since, after my son, Mr. W. B. Spence, had pointed out (Trans. Ent. Soc. i. 7), that Herodotus had noticed the use made, upwards of two thousand years ago, by the Egyptian fishermen of their fishing-nets, to screen themselves from the attacks of gnats; and I suggested to Sir John Franklin, whose probable fate now excites such intense interest throughout the civilized world, whether nets tied round the hat so as to hang over the brim, might not exclude gnats, which, in high latitudes, are often so great a pest in their hot though short summers. Until the experiment had been made, it did not follow that although flies and gnats could be excluded by wide-meshed nets from rooms, they could be equally excluded by similar nets hanging down loosely from a hat, and not tied round the neck; but the remarkable fact mentioned by Col. Moody, that 'though the meshes [of the Misses Icely's nets] were large, not to exclude the air, the flies ventured not within,' seems to render it highly probable that gnats might be excluded in this way, as well as the flies which cause the Australian fly-blight; and I would strongly advise travellers in districts greatly infested with gnats, to make the experiment. While within doors, the Chinese fumigating sticks (composed of the sawings of resinous woods, probably juniper, mixed with some inflammable material), which Mr. Fortune found so effectual in driving away gnats (Proceed. xiv.), or a similar preparation, would bethebest defence, but this is obviously inapplicable while walking, when the 'paramouche,' if found as effectual against gnats as flies, would be invaluable."

The President said that in a fowl-pen covered with a net, the meshes of which were 1½ inch wide, the flies never went through, and the poultry could never catch them, although they made many attempts to reach them sitting on the outside.

Mr. Edward Sheppard wished to make known to members visiting the Lake district, that William Greenip, of Keswick, would be found a very civil and attentive guide, and that he possessed a considerable collection of the insects of the locality.

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December 6, 1852.

J. O. Westwood, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for December; by the Editor. The 'Athenæum' for November; by the Editor. The 'Literary Gazette' for November; by the Editor. 'Proceedings of the Royal Society,' Vol. vi. No. 88—90; by the Society. 'Journal of the Society of Arts,' No. 2, and 'List of Subjects for Premiums;' by the Society. 'Description of a new Hemipterous Insect, Atelides centrolineatus, forming the Type of a new Genus,' by W. S. Dallas, Esq., F.L.S.; by the Author. Specimens of Pytho depressus (3), Cetonia ænea (4), Libellula arctica (2), Ctenophora atrata (2); by Mr. Weaver. A box of British Lepidoptera; by Mr. Douglas. Specimens in illustration of the metamorphoses of six species of Strepsiptera from Albania; by Mr. S. S. Saunders.

Henry Tompkins, Esq., of Lewes, was elected a Subscriber to the Society.

The President exhibited some new Coleoptera from Ceylon and China, from the collection of Major Champion.

Mr. F. Grant exhibited a male Lucanus Cervus, of which the right hind leg was much smaller than the left one; a remarkable variety of Triphæna janthina; and a long series of Peronea rufana, illustrating the variation of the species.

Mr. Douglas, on behalf of Mr. H. Cooke, exhibited a remarkably dark red variety of Hypochalcia ahenella, taken at Hastings.

Mr. Edward Sheppard exhibited some English ship-biscuit that had been a voyage to America and back, infested with Stene ferruginea and a species of Apate.

Mr. S. Stevens exhibited a remarkable variety of Vanessa Urticæ, bred from a larva taken near London; a specimen of Pieris Daplidice, taken by E. C. Buxton, Esq., at Holme Fen; and an example of Notodonta tritophus, captured in Scotland, from the collection of the same gentleman. He also exhibited a specimen of Monochamus Sutor, found on the banks of the Regent's Canal; one of Pogonocherus fasciculatus, bred from the hoop of a cask; and a selection of Coleoptera and Lepidoptera from a collection just received from Mundo Nova, Rio Grande, where they were captured by Mr. Plant. Many were rare or new, and all were in fine condition.

Mr. Waterhouse observed that many of the species were also found at Rio Janeiro, about 500 miles north of this locality, but there was a perceptible variation, although not amounting to specific distinction, between the insects of the two places.

The first part of an interesting and valuable memoir by S. S. Saunders, Esq., was read, entitled "Notices of some new Species of Strepsipterous Insects from Albania, with further Observations on the Habits and Transformations of these Parasites," in which several unknown points in the economy of these insects are elucidated.

Mr. Douglas read a continuation of his "Memoir on the Natural History of British Micro-Lepidoptera," the genera Gracillaria and Lithocolletis being illustrated by descriptions of the larvæ and their economy of three species of each genus, accompanied by coloured drawings by Mr. Wing.

The Secretary read the following remarks from a note accompanying Mr. Weaver's donation:—"The Ctenophora atrata I procured from hard undecayed stumps

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of trees, in which the larvæ make deep round holes, working quickly up and down them at their pleasure, and taking care to form an opening for the imago to emerge."

The President read a letter from Mr. James Crook, Turton, near Bolton, Lancashire, offering certain northern Lepidoptera in exchange for southern species.

The next part of the Society's 'Transactions,' it was announced, would be ready in a few days.

January 3, 1853.

J. O. Westwood, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors: — The 'Zoologist' and the 'Phytologist' for January; by the Editor. The 'Literary Gazette' for December; by the Editor. The 'Athenæum' for December; by the Editor. The 'Annals of the Lyceum of Natural History of New York,' Vol. v. Nos. 9—14, 1852; by the Lyceum. 'Second Report of the Commissioners for the Exhibition of 1851;' by the Commissioners. Hewitson's 'Exotic Butterflies,' Part 5; by the Author. 'Monographie des Guêpes Solitaires, ou de la Tribu des Eumeniens,' par H. F. de Saussure; by the Author.

The following gentlemen were balloted for and elected Members of the Society: William Thomson, Esq., Westow Hill, Norwood, and E. C. Buxton, Esq., Spikelands, Liverpool: also the following as Subscribers to the Society: — Mons. Victor Signoret, Paris; H. V. Tebbs, Esq., Southwood Hall, Highgate, John Scott, Esq., Ferry Road, Renfrew, and F. Moore, Esq., 4, Molesworth Place, Kentish Town.

The President, having appointed Auditors of the Treasurer's Accounts for the past year, and announced the changes recommended by the Council to be made in the Officers and Council at the Anniversary Meeting on the 24th of January, informed the Members of the death of J. F. Stephens, Esq., one of the Vice-Presidents of the Society, on the 22nd of December, after a short but severe illness; and stating that he should allude to his life and labours in the Anniversary Address, proposed as a tribute of respect to his memory that the Meeting should forthwith adjourn; which was unanimously agreed to.

Resolved further, that a letter of condolence on her melancholy bereavement, be sent to the widow of Mr. Stephens in the name of the Society.

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January 24, 1853, (Anniversary Meeting).

J. O. Westwood, Esq., President, in the chair.

The Secretary read the chapter of the Bye-laws pertaining to the Annual General Meeting, also the Report of the Library and Cabinet Committee made to and adopted by the Council.

One of the Auditors read an abstract of the Treasurer's Accounts for 1852, from which it appeared that there was a deficiency of Assets compared with Liabilities of £16; to which should be added £12 for Subscriptions due, which must be deemed to be bad debts, making a total deficiency of £28.

In drawing attention to this matter, the President stated that the Council saw no reason for despondency, for the excess of expenditure over income was due in a great measure to the unavoidable outlay in removing from Bond Street, and fitting up the Library, Museum, &c., in the new rooms; the removal itself being forced upon the Society by circumstances over which it had no control, and they therefore recommended that as the adverse balance was the result of accidental events, it should be met by a general and special subscription among the Members, in order that the operations of the Society might not be impeded.

The President having appointed two Scrutineers, the ballots took place, when it appeared that Messrs. E. Newman, W. W. Saunders, A. F. Sheppard, and S. Waring, were elected into the Council, in the room of Messrs. F. Smith, H. T. Stainton, J. J. Weir, and W. Yarrell; also, that the following were elected to the respective offices: — Edward Newman, Esq., F.L.S., Z.S. &c., President; S. Stevens, Esq., F.L.S., Treasurer; J. W. Douglas and W. Wing, Secretaries.

The President delivered the annual Address on the state of the Society, and the progress of Entomology generally during the past year; for which, and for his services to the Society, on the motion of Mr. Spence, the Members passed an unanimous vote of thanks, and he was requested to allow his Address to be printed.

Votes of thanks were also passed to the Treasurer, Secretaries, and retiring Members of the Council.

The President announced that the Council had received three essays, in competition for the prize of £5 5*s.* offered by the Society for the best essay on the duration of life in the males, female and workers of the honey-bee; that they had adopted the report of the Committee to which they had been referred, namely, that the essay bearing the motto, "In tenui labor, at tenuis non gloria" was very able and worthy of the prize; and upon the accompanying note being opened, the author was found to be Mr. J. G. Desborough, of Stamford. Mr. Desborough being in attendance, was then presented with the amount of the prize.

The unsuccessful essays will be delivered to the authors, upon the presentation of their order to do so, accompanied by a copy of the motto adopted by them, the envelopes containing their names not having been opened.

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THE PRESIDENT'S ADDRESS.

GENTLEMEN,

Time in its onward course has now brought us to the period when it becomes the duty of the President of this Society to give to its Members a retrospective survey of the past year, — when, by the wise constitution of our Bye-laws, my tenure of office has expired, and when the Society is called upon to exercise the duty of selecting a fit person as its future President, — an important one, as the character of its Officers must necessarily influence the scientific character of a Society.

The Reports from the Council and Auditors of the Treasurer's Accounts and from the Cabinet and Library Committee, which have already been read, have put you in possession of the state of our finances, and the progress which has been made in the arrangement of our collections; and although the necessity (from the state of repairs of our former apartments) which compelled us to seek for and obtain a fresh place of meeting, together with some other incidental expenses, has had the effect of rendering our financial report rather less satisfactory than ordinary, and has interfered with the arrangement of our cabinets, you will, I think, agree with me that there is no cause for being disheartened at our present position, as a moderate subscription on the part of our members (which the Council of our Society has resolved to solicit) will be sufficient to re-establish our pecuniary *status in quo;* whilst the greater convenience of the situation of our present apartments will afford increased opportunities to many of our members in aiding in the work of arrangement.

Here, however, I can but allude to the great movement now on foot, having for one of its objects the location in one grand establishment of all the scientific bodies in the metropolis. Our own Society has, during the past year, felt the necessity of such a measure in a pre-eminent degree; for when it is borne in mind that a Society like our own, possessing a valuable collection of fragile objects, as well as a good library of valuable books, paying its rent regularly, is still liable to be ejected by the landlord not performing his engagement of keeping the premises in repair, or, what is worse, is equally liable to have its property seized at any moment for arrears of rent due to the ground

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landlord,—and we have experienced both these contingencies during the past year,—no one will deny that it is the duty of the government to afford a fostering protection to such Societies, — the weaker ones requiring such support even more imperatively than the more liberally endowed ones. The Entomological Societies of France and Stettin receive pecuniary aid from their respective governments, and the former holds its meetings in the Hotel de Ville, free from charge. Under such circumstances, the influential members of our body ought to use every effort to obtain so desirable a result, even if at some minor inconvenience to the Society at large.

As regards the number of our Members, I have to inform you that during the past year four new Members and five Subscribers, together with two Corresponding Members, have been added to our lists; and that on the other hand we have lost one Member by death, three Subscribers have resigned, and one has been removed from the list, as a defaulter. I had hoped that the Bye-law which allowed the introduction of a limited number of Associates, would have had the effect of bringing into our sphere the most praiseworthy of our practical brethren, whose humble means ought not to be a bar to their admission among us. I can but regret that this Bye-law has been rendered a dead letter. In a science which numbers so few among its cultivators, I hold disunion to be very much akin to untying the bundle of sticks in the fable.

Our meetings have continued to be extremely well attended, and the exhibition of rare and new species of insects, of different orders, has rendered them interesting to our general members. I cannot however avoid expressing the regret which I feel in the non-fulfilment of the anticipations which I had formed as to the effects of the working of our Society. Comparisons are said to be odious; but I cannot shut my eyes to the vast difference which exists between the publications of the French and German Societies and those of our fellow-countrymen, many of whom, although calling themselves entomologists, cannot justly claim a higher rank than that of collectors, whilst the higher investigations into the comparative or simple anatomy of insects, internal and external, the investigation of their natural economy and transformations, and the inquiries into their natural relations, have been almost untouched by our Members. The publication of local lists of species, which is carried to a very great extent, is, it is true, practically useful to the individual captor and his immediate correspondents, but they appear to me to be hardly fitted for publication, unless either their aim is to extend our knowledge of the

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geographical limits of species, (in which point of view the memoirs published by Mr. Wollaston in the 'Zoologist' become of real value, and which would be still further increased by a comparison of the Geology and Botany of the different districts); or unless they are accompanied by critical remarks on the nomenclature or structure of the different species, of which the local lists published in the Stettin Society's 'Transactions' afford so many examples.

During the past year the Society has published four parts of its 'Transactions.' Of the various papers contained in these parts, I shall have occasion to speak in detail in the Bibliographical Notices given at the end of this Report. I must, however, more particularly allude to Mr. Curtis's practical communication on the means of destroying mould on insects, to Mr. Saunders's paper on the Coleoptera of China, to Mr. F. Smith's papers on the habits of British and descriptions of foreign Hymenoptera, and especially to Mr. Douglas's contributions to the Natural History of British Micro-Lepidoptera, and the beautiful accompanying illustrations by Mr. W. Wing. When we consider, however, that the French Entomological Society, with only about one-third more in the number of its members than ourselves, publishes annually from four to six times the amount of matter to that which appears in our 'Transactions,' I cannot but think that other causes than the limited means of our Society operate in England to prevent the prosecution of Entomology as a branch of zoological science. The inquiry is one of great interest, but of which the consideration must be deferred to some other opportunity. At the same time, however, it must be admitted that the number and activity of our collectors is greatly on the increase, and it is to be hoped that from amongst them worthy representatives of Kirby, Stephens, or Edward Doubleday will soon arise.

I have now to speak of the additions made during the past year to our Library and Collection; and in the first place have to congratulate the Society on the splendid collection of entomological works presented to it by Miss Bromfield, from the library of her late brother, Dr. Bromfield. The list of these books will be found in our 'Proceedings,' the whole being in excellent preservation, and for the most part choice copies of the several works. Our Library has also been enriched by donations from the Royal Society, the Zoological Society of London, the Linnean Society, the Society of Arts, and the Royal Agricultural Society of England; the Imperial Society of Naturalists of Moscow, the Royal Academy of Munich, the Entomological Society of Stettin,

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the Munich Society of Natural History, the Lyceum of Natural History of New York, the Smithsonian Institution of North America, and the Natural History Society of Geneva; and from Messrs. Boheman, Roth, Gemminger, Guérin-Méneville, Kollar, Spinola, De Saussure, Fischer-de-Waldheim, Gistl, Hagen, Schaum, Zetterstedt, Passerini, and Dr. Le Conte, amongst foreign entomologists, and from Messrs. Stainton, Curtis, Newman, Hewitson, W. W. Saunders, Rev. F. W. Hope, Rev. D. Melville, J. F. Stephens, Baly, Capt. Smith, Dr. Lee, F.R.S., and Rev. J. Freeman.

I am happy to say that our Collections have received considerable accessions during the past year. Amongst these the entire collection and cabinet of Dr. Bromfield, a large collection of insects from Shanghae, presented by Professor Thompson of Glasgow, and numerous species of different orders from Hong Kong, by J. C. Bowring, Esq., a large box of Brazilian insects, presented by Viscount Goderich, a fine series of small insects from Ceylon, by Mr. Thwaites, and a box of Italian insects from Professor Passerini, are especially to be noticed among the exotic additions; whilst our English collections have been enriched by donations, chiefly of Lepidoptera and Coleoptera, from Messrs. A. F. Sheppard, Douglas, Lubbock, Bedell, A. R. Hogan, Guyon, Rev. J. Greene, Shield, F. Bond, Rev. H. Clark and Weaver; and last, but not least, we have received a valuable collection of preserved British spiders from Mr. Meade, and a series of British Anoplura, named by Mr. Denny, presented by the Rev. Leonard Jenyns.

As matter of entomological information, I have further to notice that keeping pace with the increased activity of our English collectors, we have now a greater number of persons engaged in entomological pursuits in foreign climates than at any previous period, proving evidently that a taste for foreign Entomology is also steadily gaining ground amongst our amateurs. Amongst these foreign collectors are especially to be named Messrs. H. W. Bates, N. Plant and Julian Deby in South America; F. Strange in Australia; and Messrs. R. W. Plant and Zeyher in Southern Africa: and it is impossible to speak too highly of the value of the rich additions which they have made to our collections, hitherto comparatively poor in the insects of South America.* During the past year, also, Dr. Burmeister has

* Now also that the island of Madagascar is open to Europeans, it is to be hoped that some enterprising collector will speedily visit it, as the insects at present known as its inhabitants are extremely curious, interesting, and rare.

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returned to Europe, from a Natural-History tour of many months in Brazil; and entomologists will be glad to learn that he has brought home a large store of materials, not only of entomological but of general zoological importance. Mr. Wallace has also returned home from South America, but by a dreadful accident the whole of his collections were destroyed by fire during his return voyage.

As further matter of entomological information, I may add that a lecture on our science has recently been delivered by Lord Goderich, to a meeting of the United Tailors' Society of London.

It is gratifying to find that great progress has been made during the past year in the Collection of the British Museum. In so liberally endowed an establishment as the national one, Entomology has demanded and justly received a greater share of development than it can ever hope to receive at the hands of comparatively private Societies, whose resources are necessarily directed in several other channels. From information furnished by Dr. J. E. Gray, I find that there have been added to the Museum collection during the last year 9293 specimens, chiefly selected from various large collections, as those most required to complete the collection, or to illustrate the families under study. The special numbers are as follow: — Coleoptera, 2519; Orthoptera, 165; Hymenoptera, 1284; Neuroptera, 272; Rhynchota, 445; Lepidoptera, 2817; Diptera, 280; larvæ and cocoons, 108; Aptera, 246; Crustacea, 438; Anoplura, 719. The following families have been particularly studied, extended, named and catalogued, *viz.*: — Longicornes and Passalidæ, Andrenidæ, Phryganeidæ and Hemerobiidæ, Papilionidæ, British Tortricidæ and Pyralidæ, Anoplura and Coreidæ. The Catalogue of Papilionidæ has been illustrated with coloured figures of the new species. Those of the other families above named have either been already published, or are now in the press. The Bombycidæ have been partially re-arranged and named.

The chief additions recently made to the entomological treasures of the Paris Museum, are the collections of Chilian insects of M. Gay, and those from Algeria formed by M. Lucas and other entomologists. From Berlin I learn that the chief additions made to the entomological cabinet, are the collections of Mozambique insects made by Mr. Peters, the Coleopterous portion of which is very rich, including, for instance, two new species of Tefflus, a new Goliath beetle, &c.; these will shortly be described by Dr. Klug, who, although nearly eighty years old, is still in excellent health. The Diptera have already been described by Loew, and the Hemiptera are in the hands of Dr. Schaum. Charpentier's collection has also been purchased by

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the Prussian Government; the only important part of it, the Orthoptera, will be retained by the Berlin Museum, and the remainder will be sent to the University of Konigsburg.

With a view of rendering the Society's labours practically useful, the plan of offering a prize for the best essay on a given subject has been again resorted to, a plan which had on previous occasions been successful by calling forth Mr. Le Keux's 'Essay on the Turnip-flea Beetle,' and Mr. Newport's 'Essay on the Athalia Centifoliæ.' On this occasion, the difficult question of the length of life of the three kinds of individuals of which the hive is composed, was selected, with reference also to the consequential practical relative advantages of preserving swarms or stocks; and I am happy to inform you that the Council have received three essays in competition, and that one of them, by Mr. J. G. Desborough, of Stamford, in which the subject is treated in a very careful manner, has been unanimously considered by the Committee to which they have been referred, as deserving of the prize.

I must here allude to the remarkable effects recently produced by the application of photography in the delineation of objects of Natural History, not only of the natural size, but more or less magnified. The ease with which these results are produced, and the necessary truthfulness and artistic effects with which they are accompanied, cannot fail to give a far greater development to the employment of the microscope in the investigation of the more minute objects of our study, and their anatomical structure, than it has hitherto received; indeed, I consider it to be a great reproach to our Society that so little has hitherto been done in this direction by our members, at a time when such improvements have been made in the microscope.

Entomology, Gentlemen, I am pained to say, has experienced several grievous losses during the past year.

Let those entomologists still amongst us, who recollect (for those who do not can scarcely form a fitting idea of the difference) the state of Entomology and the means of study, in the year 1823, as compared with 1853, let them, I repeat, say whether James Francis Stephens is not entitled to the chief merit for having advanced its progress.

The tomb has too recently closed over his remains to enable us to think dispassionately of the services he has rendered to our science; but the herculean task of his 'Systematic Catalogue,' and his equally remarkable 'Illustrations,' produced, as the latter often were, in seasons both of mental and bodily anguish, claim a kindlier word, and deserve far warmer thanks than they have yet received.

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James Francis Stephens, F.L.S., F.Z.S., M.E.S. Fr. and Lond., was born on the 16th of September, 1792,* and died on Wednesday, the 22nd of December last, in the sixty-first year of his age, after a very short but severe illness. In a paper written by himself, and dated on the sixtieth anniversary of his birth, published in the 'Zoologist' since his decease, is the following autobiographical passage: —

"In my sixteenth year (the figures of which are now exactly reversed, being a sexagenarian this day—notwithstanding which I have had the temerity to undertake the task of endeavouring to arrange and catalogue the truly magnificent collection of Linnean Phalænæ in the British Museum, probably 7000 species), I prepared my first 'Catalogue of British Animals,' by which it appears that only 3673 indigenous species of insects were known at that period (1808—12), including, with the (sub-) species of Haworth &c. then recognized, 1367 Lepidoptera. Time progressed; and although I was wholly occupied during the day in business, and engaged in the evening in preparing the twelve first volumes of the 'General Zoology' for publication, as well as deeply immersed in studying the mysteries of Electricity, &c., I advanced so rapidly with my collections of British shells and insects, that I had more than doubled the number of the latter by 1822, and I contrived nevertheless gradually to work up the 'Catalogue of Insects,' until, on its publication in 1829, I actually registered no less than 10,116 species,—two-thirds, at least, captured by myself,—although at this time there were not half-a-dozen collections named in England, and those only partially so; and as I had no transmarine or other assistants to clear up doubtful points, possessed but a trifling entomological library, and had to ferret out the names as best I could, frequently from works in the Teutonic and other European languages,—it is not to be wondered at, that with all these disadvantages and engagements—personal and domestic illnesses, &c.; —I was occasionally at fault, especially when we find that individuals who devote the greater portion of their lives to one order, group, or family of insects &c., are equally, if not, in proportion to their limited researches and better opportunities, more so."

Mr. Stephens was for many years a clerk in the Admiralty-office, Somerset House, having lately been superannuated. In the year 1818, on the recommendation of Dr. Leach, and at the request of the Trustees of the British Museum, the Government gave Mr. Stephens

* This information is given from Mr. Stephens's own signature in my 'Album Amicorum.'

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permission to leave his office for a time, and to assist Dr. Leach in the arrangement of the insects in the British-Museum collection. For the last half-century he had devoted the whole of his leisure to the study of Natural History, particularly Entomology, and had formed the largest and most complete collection of British insects ever brought together, the whole preserved in the most admirable order; indeed, the surprise manifested by Drs. Boisduval, Herrick-Schaffer, and other foreign entomologists, whom I had the pleasure to accompany to Mr. Stephens's abode, was quite unbounded. From the great value of this collection, as containing the types described in Mr. Stephens' 'Illustrations,' as well as the whole of the Marshamian types, and a number of those of Francillon and Haworth, it is greatly to be desired that this collection should not be broken up, but should be purchased entire by the British Museum, where it would remain as accessible to the student as it was at Mr. Stephens' residence during his life-time. As may easily be judged from what has been already stated, Mr. Stephens was a most indefatigable collector of all the orders of insects, combining in an extraordinary degree practical experience in the field with the knowledge of the enlightened student and scientific reader; during the last twenty years he had, indeed, spared no expense in forming a very complete entomological library, which, like his collections, was accessible to any person who wished to consult it for scientific purposes, on the Wednesday evening in each week. He also formed a collection of illustrations of the transformations and habits of insects, as well as of British Crustacea, &c., which last were a few years ago added to the Hopean collection now at Oxford. The earnestness with which he studied British Entomology, induced him to reject from his cabinet every specimen not indigenous, barely tolerating foreign examples of rare or doubtful species, which he kept in a detached cabinet. This fact of course gives a greater value to his general collection, as a purely national one.

To this extraordinary liberality in communicating or affording information to all who sought it at his hands, Mr. Stephens added a mild and unpretending demeanour. That in his zeal for extending our knowledge of British Entomology he fell into the error of regarding many simple varieties as distinct species, and that having, as he supposed, obtained an insect agreeing with the description of a species given by a continental writer, he subsequently incorporated such description with his own, are circumstances which, to a certain extent, are to be regarded as imperfections, now that our extended knowledge enables us to look at these matters in a clearer point of view. The passage

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penned by Mr. Stephens himself, at the commencement of my notice concerning him, admits and excuses the former of these faults; the latter appears to be still more excusable. Indeed, if a writer be clearly of opinion that an insect he is describing is identical with one described by another author, I consider not only that he is justified, but would be inexcusable were he to omit in his description such characters as the former describer had observed, but which were not exhibited in his perhaps unique individual.

This slight sketch of Mr. Stephens's history would scarcely be complete were a notice of the unsuccessful suit at law in which he was for a length of time engaged against James Rennie, for alleged piracy of the 'Illustrations' in the publication of the 'Conspectus of British Butterflies and Moths,' to remain unnoticed. The opinion of the scientific world on the result of that suit was fully shown by the unsolicited subscription entered into by his friends, for defraying the heavy legal expenses attendant upon his defeat.

In addition to the continuation of Shaw's 'General Zoology,' containing the birds, which first made the English naturalist acquainted with the modern system of classification now universally adopted, Mr. Stephens was author of the following entomological works: —

Some Observations on the British Tipulidæ, together with Descriptions of the Species of Culex and Anopheles found in Britain. Zool. Journ. i. No. 4, p. 448, January, 1825.

Note on a Memoir of Mr. Haliday, on Insects taken in the North of Ireland, with the Description of a new Species of Anopheles. Zool. Journ. No. 12, p. 502, April, 1828.

A Systematic Catalogue of British Insects, being an attempt to arrange all the hitherto discovered indigenous Insects in accordance with their Natural Affinities, containing also the references to every English writer on Entomology, and to the principal foreign authors, with all the published Genera to the present time. London: 1828. 8vo.

In this most laborious volume of 838 pages, not less than 10,116 species are catalogued, with their synonyms, and full references to the works in which they are described.

The Nomenclature of British Insects, being a Compendious List of such Species as are contained in the 'Systematic Catalogue of British Insects.' London: 1829. Small 8vo.

Ditto. Second edition: 1833.

Illustrations of British Entomology, or a Synopsis of indigenous Insects, containing their generic and specific Descriptions, with

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an account of their Metamorphoses, times of Appearance, Localities, Food, and Economy, as far as practicable, with coloured figures of the rarer and more interesting species. London: large 8vo.

MANDIBULATA.

Vol. 1—5, 1828—1832. Order Coleoptera.

Vol. 6, 1835—1837. Orders Dermaptera, Orthoptera, Trichoptera.

Vol. 7, 1835, 1836, and 1845. Order Hymenoptera, Tenthredinidæ to Ichneumonidæ.

Supplement, August, 1846, containing Preface, and Descriptions of species of Hymenoptera and Strepsiptera figured in the plates.

HAUSTELLATA.

Vol. 1—4, 1828—1835. Order Lepidoptera; with a Supplement, containing an Abstract of the indigenous Lepidoptera contained in the 'Verzeichniss bekannter Schmetterlinge,' by Hübner, and with Descriptions of a number of species of Diptera represented in the plates.

Manual of British Coleoptera or Beetles, containing a brief Description of all the species of Beetles hitherto ascertained to inhabit Great Britain and Ireland, together with a Notice of their chief Localities, times and places of Appearance, &c. London: 1839. 8vo., pp. 455.

A Description of Chiasognathus Grantii, an Insect forming the type of an undescribed Genus. Cambridge Phil. Soc. Trans. 1831. With 2 coloured plates.

On the apparent Identity of Sphinx Ephemeræformis of Haworth with Psyche plumifera of Ochsenheimer. Trans. Ent. Soc. i. p. 76.

Description of Cucullia Solidaginis, together with its Larva. Trans. Ent. Soc. ii. 57.

An Address on the Fourth Anniversary of the Entomological Society, Monday, January 22, 1838.

Reply to Mr. Davis's Animadversions upon the recent method of publishing the 'Illustrations of British Entomology.' Loudon's Mag. Nat. Hist. iv. 488.

Note on the Review of Newman's 'Essay on Sphinx Vespiformis,' Id. v. 393.

Note on the Insensibility of Insects. Ent. Mag. i. 518.

Discovery of Sphinx Nerii in England. Id. i. 525.

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Longevity of Lepisma saccharina and other Insects. Id. i. 526.
Remarkable capture of Butterflies. Id. i. 527.
Mode of killing Insects with Laurel-leaves. Id. ii. 437.
Captures of Vanessa Antiopa &c. Id. iii. 415.
Description of Zeuzera Arundinis. Entomologist, p. 160.
List of Insects found near Harrietsham, Kent, with the Description of a new genus of Yponomeutidæ (Parasemia transversalis). Id. p. 199.
List of some of the rarer Insects taken near Weybridge. Id. p. 374.
Captures near Guildford. 'Zoologist,' p. 30.
Capture of Yponomeuta sedella. Id. p. 687.
Note on Geometra gemmata. Id. p. 946.
On the occasional rarity of British Insects. Id. p. 1616.
On Coccinella labilis, *Mulst.* Id. p. 1864.
Reply to Messrs. H. Doubleday and Guenée, on the Generic Names employed in the British Museum Catalogue of British Lepidoptera. Id. July, 1851.
Descriptions of Selandria sericea, *Hartig*, and of the male of Lyda inanita. Id. July, 1851.
Notice of further captures of Gastropacha Ilicifolia. Id. October, 1851.
Notes on Trochilium Chrysidiforme and Gastropacha Ilicifolia. Id. February, 1852.
Reply to Mr. H. Doubleday's "Notes on Mr. Stephens's 'Catalogue of Lepidopterous Insects in the Cabinet of the British Museum, (Tortrices).'" Id. January, 1853, (p. 3738); with other minor notes published in the same work.
The Entomological Articles in the 'Encyclopædia Metropolitana.'

The death of Mr. Wm. Thompson, F.L.S., &c., President of the Natural-History Society of Belfast, took place very suddenly on the 17th February last, in London, where he was on a visit, making arrangements for the then approaching meeting of the British Association for the Advancement of Science at Belfast, of which he had been appointed a Vice-President. He was well known as a writer on various branches of Natural History, as well as for the ardour with which he investigated the Zoology of his native country; the large number of his papers in Loudon's 'Magazine of Natural History,' the 'Annals and Magazine of Natural History,' and other zoological periodicals, attesting his great diligence. He was also an early friend of the British Association, and at the meeting held at Glasgow delivered in a Report on the Fauna of Ireland. He also subsequently communi-

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cated other papers on the Natural History of Ireland. His investigations on the Zoology of Ireland were intended by him to be published as a portion of a great work on the Natural History of that island, of which only the first part — 'The Birds of Ireland' — has yet been published; but he had made arrangements for the publication of his MSS. in the event of his death, so that no further delay than is unavoidable will occur in the publication of the remaining volumes. As regards the annulose animals, he had paid great attention to the Crustacea, as may be seen in almost every page of Professor Bell's work on the subject; and two days only previous to his death, I had an interview with him relative to the investigation and publication of his collection of Edriophthalmatous Crustacea. He died in the forty-seventh year of his age.

During the past year, also, Thomas Norris, Esq., of Redvales, near Bury, Lancashire, the possessor of a splendid collection of exotic insects, has departed this life. He was an early member of our Society.

I am sorry to have to state also, that Mr. Swanzy, a gentleman by whom many interesting insects have been collected in tropical Western Africa, has been lost by shipwreck, the vessel in which he was making the outward bound passage having foundered in the Downs during the terrific gales of last August.

Of foreign entomologists I have to record the death of Monsieur le Baron Charles Athanase Walckenaer, the distinguished perpetual Secretary of the Academy of Inscriptions and Belles Lettres, and Member of the Institute of Paris, and the author of the following important works, by which the study of Arachnology has been very much advanced: —

Faune Parisienne, (Insectes): 2 vols. 8vo. Paris: an 11, (1802).

Mémoire pour servir à l'Histoire naturelle des Abeilles solitaires composant le genre Halicte. 8vo. Paris: 1817.

Recherches sur les Insectes nuisibles à la Vigne connus des Anciens et des Modernes, et sur les Moyens de s'opposer à leurs Ravages. Ann. Soc. Ent. France, t. iv.

Tableau des Araneides, ou Caractères essentielles des Tribus, Genres, Familles, et Races que renferme le genre Aranea de Linné, avec la designation des Espèces comprisés dans chacun de ces divisions. 1 vol. 8vo., with figures. Paris: 1805.

Histoire des Araneides. A work which appeared in livraisons, on the plan of Panzer's German insects. Five parts only appeared.

Araneides de France. Forming part of the 'Faune Française.'

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Mémoire sur une nouvelle espèce de Mygale, sur les Theraphoses et les divers genres dont se compose cette tribu des Araneides. Ann. Soc. Ent. France, 1835.

Mémoire sur une nouvelle Classification des Araneides. Ann. Soc. Ent. France, 1833, p. 414.

Histoire naturelle des Insectes Aptères. 4 vols. 8vo. Paris: 1837—1847. (The third and part of the fourth volume by M. Gervais).

The Baron Walckenaer died on the 27th of April, 1852.

Of M. Solier, of Marseilles, who was born on the 8th of February, 1792, and who died on the 27th of November, 1851, an extended biographical notice is given by M. Mulsant in his 'Opuscules Entomologiques,' recently published. His works possess great merit, the more especially as the chief of them were devoted to the sombre and comparatively neglected tribes of the Melasomatous Heteromera among the Coleoptera, to which order he confined his researches. His first essay upon the Buprestidæ appeared in the 'Annales' of the French Entomological Society for 1833; and many of the subsequent volumes of that work show his extreme activity. Of his work on the Heteromera, thirteen essays of great extent appeared in the 'Annales' from 1834 to 1841; they were subsequently continued in the 'Memoirs of the Turin Academy,' in which the Molurites were described, (2nd series, vol. vi.); and the Blapsidæ appeared in the 2nd livraison of Baudi and Truqui's 'Studi Entomologici' for 1848.

His other papers are as follow: —

Observations sur les genres Brachinus et Aptinus. Annales, 1833, p. 459, and 1834, p. 655.

Observations sur le genre Ditomus. Id. 1834, p. 659.

Réponse à l'Examen des genres Brachinus et Ditomus de M. Brullé. Id. 1836, p. 691.

Observations sur les genres Procrustes, Procerus, Carabus et Calosoma. Baudi et Truqui's Stud. Ent. fasc. 1, 1848.

Description d'une espèce nouvelle des Carabiques. Annales, 1835, p. 111.

Mémoire sur quatre genres nouveaux des Carnassiers terrestres. Id. 1836, p. 589.

Description d'une nouvelle espèce de Gyrinus. Id. 1833, p. 464.

Observations sur les Hydrophiliens. Id. 1834, p. 299.

Lettre sur les Buprestides. Id. 1834, p. xcix.

Remarques sur l'Anthicus instabilis. Id. p. lxvi.

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Réponse sur les Habitudes de quelques Melasomes. Id. 1837, p. 481.

Mémoire sur deux nouveaux genres des Curculionites de Chili. Id. 1839, pp. 1 and xlix.

Sur les Tarses des Longicornes. Id. 1834, p. 299.

Description of the Transformations of Parmena pilosa. Id. 1835, p. 123.

Description d'une nouvelle espèce de Cryptocephalus. Id. 1836, p. 687.

Notice of the Appearance of Species of Orthoptera near Marseilles. Id. 1833, pp. 486 and xlix.

Observations on the Stridulation and Chirping of the Cicada. Id. 1837, p. 199.

The portion of the Descriptions of Insects in Gay's 'Historia Fisica y Politica di Chili,' comprising the Pentamerous and Heteromerous Coleoptera.

M. Hippolyte Gory also departed this life during the past year, having for several years previously suffered from an incurable malady, which had entirely abstracted him from his favourite pursuit. His most important contributions to entomological literature are the 'Monographie des Scarabées Melitophiles (Cetoniadæ),' conjointly with M. Percheron, a splendid although not a profound work, published in 1831; and the still more extensive Monograph of the Buprestidæ, Clytus and Psilocera (Pogonostoma, *Klug*), published in conjunction with M. Laporte de Castelnau.

He also published a considerable number of detached descriptions of Coleoptera generally remarkable for their beauty, in Guérin's 'Magasin de Zoologie,' Silbermann's 'Revue Entomologique,' and the 'Annales' of the French Entomological Society for the years 1831—1834, including a 'Century of new Carabiques,' (Annales, ii. p. 168); and a 'Monograph on the Genus Notiophysus,' (Id. iii. p. 453); a 'Monograph on the Genus Sisyphus,' (8vo., Paris, 1833); and 'Descriptions of forty new Species of Cetoniadæ from Madagascar,' in Silbermann's Rev. Ent., No. 15, 1835.

I have also to announce to you the death of the distinguished German entomologist, Philip Wilbrand Jacob Müller, on March 31, 1851, at the age of seventy-nine years. He was the author of numerous papers, chiefly upon Coleoptera, which appeared in Illiger's and Germar's Magazines of Entomology: amongst which are Memoirs on the articulations of the tarsi of Coleoptera; Descriptions of Limnius and Macronychus, two new genera of Coleoptera; and Descriptions of

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various new species of the same order: also of Memoirs on the habits of the hornet (*Vespa Crabro*), and of Lampyris hemiptera: and (in conjunction with his friend Kunze, whose decease I had to record in my Address of last year) of a 'Monograph of Scydmænus,' in the Acta Natur. Scrut. Lips. i. 1823. He was also the chief author of the 'Entomologische Hefte' (8vo. 1803), containing Monographs on Haltica, Hister, Dorcatoma, &c.

I have still further to record the deaths of several less known foreign entomologists: namely, M. Robyns of Brussels, the possesser of a collection of rare and splendid insects, and other productions of nature and art; of M. Pierret, sen., who died on the 11th of November, 1851; M. Blisson of Le Mans, the author of several short papers in the 'Annales de la Soc. Ent. de France,' who died on the 31st of December, 1851; Herr Beske, the well known collector of insects, long resident in Brazil; and lastly, M. Vaillant, an excellent entomological artist, whose figures (too few of which have been published) exhibit a freedom from artistic mannerism very rarely to be found.

I have now, Gentlemen, to draw your attention to the general progress of entomological literature during the past year, in which, as in my previous Anniversary Address, I shall again arrange my notices according to the arrangement of the orders and families, as being by far the most satisfactory and easy of reference. Before commencing this, however, which is added as an Appendix to this Address, I must again beg leave to thank you for the kindness with which you have supported me in this chair, and to express a hope that my zeal for Entomology in general, and this Society in particular, may be pleaded as an excuse against any short-comings which may have been observed during my period of service as President of the Entomological Society of London.

Insects in general.

Biographical and Bibliographical Notices. — I cannot open my Bibliographical Synopsis of the past year, with a more interesting or important work than the 'Life of the Rev. William Kirby, M.A., F.R.S., F.L.S., &c., Rector of Barham.' By John Freeman, M.A., Rural Dean, &c. As a zealous country clergyman, Mr. Kirby's life did not, of course, offer many striking events for his biographer; but the state of the science seventy years ago, when even the Linnean Society was not established, and its gradual progress to its present state, when we have not only a Linnean, but a Zoological and an Entomological Society, an Entomological Club, and a Practical Entomological Association, in this country, to say nothing of the foreign Entomological Societies abroad, are so fully developed in the pages of the work before us, as to give to it a very high value. The correspondence of Mr. Kirby with all the

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chief entomologists of his day, — Latreille, Fabricius, Afzelius, Gyllenhal, Leach, MacLeay, — and above all, the numerous letters given from the correspondence between himself and Mr. Spence, add other charms to the volume; and from the latter we learn the interesting fact, that the world-famed 'Introduction to Entomology,' although first suggested by Mr. Kirby, owes its great interest to Mr. Spence, Mr. Kirby having proposed it merely as a work on the plan of Marsham's 'Entomologia Britannica;' whereas the suggestion to make the work a "*popular* introduction to Entomology,"* including "the uses, properties, habits &c. of insects," was that of Mr. Spence. Other interesting pieces of bibliographical information are, that Lewin's 'Natural History of the Lepidoptera of New South Wales' was written by MacLeay, (p. 227): and that the entomological descriptions in Sowerby's 'British Miscellany,' were written by Mr. Kirby, (p. 275).

M. Mulsant has published an excellent Biographical and Bibliographical Memoir of M. Solier, in his 'Opuscules Entomologiques.'

A necrological notice of Gustav Kunze, by Herr Reichenbach, delivered at the meeting of the Natural History Society of Leipzig, on the 13th of May, 1851, has been published.

An interesting notice of the late Mr. Melly, by Dr. Schaum, is given in the Stettin Ent. Zeitung for March, 1852.

A biographical notice of the late Professor Car. Guiseppe Gene, by M. Sismondi, appears in the 'Memoirs of the Royal Academy of Turin,' 2nd ser. tome xi.

The Annual Summary of Entomological Bibliography, commenced by Burmeister and Erichson, has been continued by Dr. Schaum, to whom we are now indebted for the Berichts of the years 1849 and 1850.

A revision of the Entomological Publications for the year 1851, containing, 1. Works published in America; and 2. Works published elsewhere, comprising descriptions of insects of (North and South) America, has been published by Charles Gerard in the 'American Journal of Science and Arts,' 2nd ser. xiii.

M. Bohemann has published a Synopsis of the works upon Insects, Myriapoda, and Arachnida for the years 1849 and 1850, in the Kongl. Vensk. Akad. Stockholm, 1852, containing notices of a vast number of books and memoirs, not at all or scarcely known in this country.

The Address delivered by myself on the 26th of January, 1852, together with a Bibliographical Appendix of works published in 1851, has been honoured by publication in our 'Proceedings.'

General Introductory Works. — The 'Cours Elémentaire d'Histoire Naturelle: Zoologie,' by Professor Milne-Edwards, has reached a sixth edition. The sale of 24,000 copies sufficiently attests its value, whilst the statement on the title-page, — "Ouvrage adopté par le Conseil de l'Instruction Publique, et approuvé par Monseigneur l'Archevêque de Paris," — indicates a system of public instruction, including Natural History, which has been hitherto advocated in this country by our best authors, but in vain. The first half of this work treats upon the generalities of the subject, the functions, senses, and structure of animals, whilst the second half of the volume is devoted to a concise but well-defined sketch of the classes and orders of the Animal

* Letter to Mr. Kirby, November 3, 1808, p. 286.

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Kingdom; the whole profusely illustrated with excellent wood-cuts, and forming one of the most complete pocket volumes ever published.

The second volume of Professor T. Rymer Jones's 'Natural History of Animals' is devoted to the Annulosa, and contains a popular introduction to the Crustacea, Arachnida, and Insecta, illustrated with numerous wood-cuts.

Anatomical Works.—A Memoir on the Blood-proper and Chylo-aqueous Fluid of the Invertebrated Animals, by Dr. T. Williams, was read before the Royal Society on the 18th of March, 1852, (Proceedings, p. 163).

A memoir by M. Léon Dufour, in opposition to the Peritrachean System of Circulation proposed by M. Blanchard, was communicated to the Académie des Sciences on the 17th of November, 1851.

A translation of Filippi's treatise on the Circulation in Insects in general, and in the Silk-worm in particular, with reference to the peritrachean system, is given by Herr Dohrn in the Stettin Entomol. Zeit. for August, 1852.

M. Peligot's memoir on silk-worms chemically and physiologically considered, has been translated in the 'Gardener's Chronicle,' 1852, p. 484, 500; and see pp. 165, 181, 197, 453, and 520, for other notices on silk-worms.

M. Emile Blanchard's work, 'l'Organisation du Règne Animal' (which appears periodically, each part containing two highly finished plates and text), comprises in the parts already published, the nervous, arterial, and tegumentary systems of Scorpio occitanus, and the arterial and other systems of Mygale Blondii.

A series of Notes on the Internal Anatomy of Insects belonging to different Orders, has been published by M. Laboulbène, Ann. Soc. Ent. Fr. 1852, 2nd ser.

A notice of the Memoir by M. Quatrefages on the general Cavity of the Body of Invertebrated Animals, published in the Bibl. Univ. de Genève, Sept. 1851, is given in the Annals of Nat. Hist. Feb. 1852.

A memoir by Giebel on the minute anatomy of the antennæ of insects, is given in the 'Annals of the Natural History Society of Halle,' 3rd year.

M. Lacaze Duthiers has continued his researches on the "armure génitale femelle des insectes," investigating the structure of the ovipositor of the Orthopterous families. The views of Audouin and Milne-Edwards, on the uniformity of composition of the different segments of the body of an insect, are adopted, as well as the nomenclature proposed by the latter, and the various component parts of the ovipositor, although very varied in structure, are shown to be formed upon one general plan.

Mr. Gorham has published an elaborate memoir, entitled 'Remarks on the Cornea of the Eye in Insects,' Quart. Journ. of Microscop. Science, i. pt. 2, p. 76.

Geographical Distribution.—Some observations on the extensive geographical range of certain forms and species of Insects, occasioned by the exhibition by Mr. A. White, of various species sent from Labuan for the Society by Mr. Lowe, appear in our Proceedings, January, 1852.

Mr. A. White has recorded the capture of Acherontia Atropos so far North as the Shetland Islands.

Some instances of the extent of the geographical range of Insects have been noticed in the Ann. Soc. Ent. Fr. 1852, xxiii. and xxv.:—Anisodactylus Heros, a native of Portugal and Algeria, having been also found at Nice; Heliothis armigera, a native of France, in Algeria; and several moths, previously only found in the East of

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Algeria, having been captured in the West; Phlœophilus Edwardsii, only previously captured in England, has also been taken by M. Aube at Compiegne; Lygæus crassicornis, previously only captured in Algeria, has been taken near Dijon.

A note by Dr. Hagen, on the geographical limits of the Entomology of Europe, appears in the Ent. Zeit. of Stettin for May, 1852.

Mr. White exhibited some insects, chiefly Coleoptera, from Little Thibet, collected at an elevation of 8,000 feet, among which were Chrysomela fastuosa, Peryphus littoralis, Stenus ater, &c., identical with British specimens (Proc. Ent. Soc. for April, 1852).

A paper entitled "Notes on the Distribution of Insects in Geographical Regions," by Mr. F. Walker, but containing only a long list of all the valleys in the world, is given in the 'Zoologist,' 3713.

Antediluvian Entomology.—A memoir by Dr. Loew, 'Ueber den Bernstein und die Bernstein Fauna,' 4to., has been published at Posen.

A memoir by the Rev. P. Brodie 'On the discovery of Remains of Insects in the Tertiary Clays and in the Kimmeridge Clay of Dorsetshire,' was read at the Geological Society on the 5th of January, 1853.

An article by Oswald Heer, on the Lias of the Canton Aargau, contains descriptions of a number of fossil Insects, chiefly Coleopterous, with a few Orthoptera and Hemiptera, 4to., Zurich, 1852.

A memoir by Giebel, on the fossil Insects of the "Wettiner Steinkohlen Gebirge," appears in the 'Annals of the Natural History Society of Halle,' 2nd year.

A short notice has been published by the Rev. F. W. Hope, on fossil Insects, entitled 'Descrizione di alcune Specie d Insetti Fossili.'

Ravages of Insects.—The various communications made by M. Guérin Méneville to the Académie des Sciences during the past year, noticed in detail below, on the destructive powers of various insects, such as the Butalis cerealella, Dacus Oleæ, Iassus vastator, Hylesinus piniperda, and upon Muscardine, as well as on the discovery of a French species of cochineal, have been accompanied by a series of remarks on the necessity of a careful investigation of their habits by competent naturalists, by which alone fit remedies can be discovered against their attacks. These remarks are perfectly just; and in a country in which the cultivation of silk, olives, grapes, rape, and wheat are all such important objects of industry, and all so subject to the attacks of insects, it is a national disgrace that there is no permanent and well-endowed situation, to which a man like Guérin-Méneville can be appointed, with a view to his entire occupation in researches so essential to the well-being of the community at large, without being left to carry on his investigations either from his own resources, or upon the casual benevolence (as it may almost be termed) of some wealthy cultivator. A country so liberal in sending forth scientific missions to foreign climates, ought not to want reminding that there are objects nearer home equally worthy of research. A careful study of the famous discourse of Linnæus, "De Peregrinationum in Patriâ Necessitate," would show that benefits of a different character to political ones may be obtained by a journey to the South of France.

A volume upon the Insects obnoxious to Trees and Plants has been published by M. Macquart, entitled, 'Les Arbres et Arbrisseaux de l'Europe, et leurs Insectes,'

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(Lille, 1852, 8vo.) The work is arranged according to the orders of the trees and plants.

Articles by myself on the following species of Insects obnoxious to the gardener and horticulturist, namely, Trichiosoma lucorum, Phibalocera Quercana, Argyromiges ruficapitella, Anthophora retusa, Galleria alvearia, Psylla Buxi, Adelges Abietis, Lophyrus Pini, Agrotis segetum, and Gracillaria V-flava, with illustrations, have appeared in Dr. Lindley's 'Gardeners' Chronicle' during the past year.

A paper by Kollar, 'Ueber zwei der Schwarz föhre Schädliche Insecten,' is given in the Verhandl. Zool. Bot. Ver. Vienna, Bd. 1.

An extensive series of articles by Mr. Curtis, on the insects which injure or benefit our crops or domestic cattle, has appeared in Morton's 'Cyclopædia of Agriculture,' now in course of publication.

A Memoir by M. Focillon on the serious ravages* of different species of insects upon the crops of rape, appears in Guérin's Rev. Zool. 1852, p. 123. The insects in question are Grypidius Brassicæ and four species of Haltica in the perfect state, and also the larvæ of the Grypidius, and of Ypsolophus Xylostei, *Fab.*, and another undetermined larva.

A note by Mr. Edgar Layard, on the insects which attack bamboo erections in Ceylon, is given in our 'Proceedings,' July, 1852.

A note by M. Guérin Méneville, on the existence of double broods in the year in many species of obnoxious insects, especially Chlorops and Hylesinus piniperda, and on the consequences thereof in respect to the remedies to be adopted in destroying them, appears in the 'Mémoires de la Société d'Agriculture,' 1851.

A memoir by M. Robouam, entitled 'Therapeutique de la Maladie Speciale des Végétaux,' in which the author treats of the effects of the attacks upon vegetables by Coccidæ, Aphides and Acaridæ, was read at the Académie des Sciences on the 24th of November, 1851).

A memoir by M. Léon Dufour, on the Diseases of Grapes, containing considerable entomological details, has been published in the 'Mémoires' of the Academy of Bordeaux.

The advantage of protecting insectivorous birds, with a view to the destruction of insects obnoxious to vegetables, has been insisted upon by M. Buisson in a note addressed to the Académie des Sciences, July 5, 1852.

A suggestion by M. Mocquerys, of Rouen, as to the services rendered to agriculturists by the mole, is worthy of note. On repeated dissection, this animal has been found to be insectivorous, and by allowing it to propagate, great numbers of the larvæ of Melolonthidæ would be consumed, and their ravages prevented, (Ann. Soc. Ent. France, 1851, cii.)

Monstrosities.—M. Lucas has described a monstrosity occurring in Colias Edusa, in which the wings and other organs on the left side of the body, as well as the markings of its wings, were considerably diminished in size, (Ann. Soc. Ent. France, 1851,

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* Some idea may be formed of the extent of these ravages, when it is mentioned that a crop which, in the preceding year, realized 7,500 francs was reduced in value to 3,700.

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cxii.) The same author has also noticed a Pieris Daplidice only three-fourths of the ordinary size, with the dark spots of the wings only slightly marked, (Id. cxii.)

A curious notice by Mr. Harding, of the occurrence of a number of specimens of Harpalyce achatinaria, both reared and captured at large, some with only one, and others without either, of the hind wings, is given in the 'Zoologist,' October, 1852.

Two cases of mostrosity occurring in the male and queen of the hive bee, have been noticed by myself, (Proc. Ent. Soc. August, 1852).

A specimen of Polydrusus corruscus, having the appearance of an ocellus above the right eye, has been exhibited by M. Javet to the Ent. Soc. France, (Annales, 1852, xxx.) M. L. Fairmaire also exhibited a Trichodes alvearius, with the elytra strongly narrowed before the extremity, which is recurved and spoon-shaped, (Id.)

A gynandromorphous individual of Anthocharis Cardamines, with the left side male and the right female, has been described and figured by M. Bellier de la Chavignerie, (Ann. Soc. Ent. Fr. 1852, 2 trim.)

Mr. F. Bond exhibited a monstrous specimen of the pupa of Sphinx Ligustri, having the sheath of the spiral tongue distinctly bifurcate, (Proc. Ent. Soc. March, 1852).

A curious instance of monstrosity occurring in the silk-worm has been described by M. Bassi, in which the 7th and 9th segments were brought into contact in the median dorsal line, the 8th segment appearing only at the sides; the 3rd membranous leg on the left side was wanting, (Ann. Soc. Ent. France, 1852, ix.)

General Descriptive Entomology.—An important work on the insects of Chili collected by M. Gay, has for some time past been in course of publication in Paris, containing a vast number of new genera and species of the various classes and orders, and illustrated with an atlas of plates. Vol. III. comprises the Crustacea, described by Nicolet; Vol. IV. the Myriapoda and Arachnida, by Gervais, the Thysanura by Nicolet, and the Coleoptera as far as the end of the Heteromera, by Solier; the remainder of the Coleoptera by Blanchard, in Vol. V. Vol. VI. contains the Orthoptera and Neuroptera by Blanchard, and the Hymenoptera by Spinola; Vol. VII. the Lepidoptera by Blanchard, and Hemiptera (in the press) by Spinola; and Vol. VIII. the Diptera (in the press) by Blanchard. The price is 50 francs per volume, including the plates.

The insects collected during the travels of M. Th. Lefebvre and other naturalists in Abyssinia, undertaken as a government commission, have been described by M. Guérin Méneville, in the 6th volume of the work published by the French Government descriptive of the voyage. A great number of species, including many new ones belonging to the orders Coleoptera, Hemiptera, Orthoptera, Hymenoptera and Lepidoptera, are described and figured. Amongst these are especially to be noticed a great number of species of Lycus, some magnificent Pompilidæ, an Oryssus with pectinated antennæ, and a very fine Saturnia. Amongst the notes appended to the species, it is recorded that the larvæ of Diplognatha gagates destroy the roofs of the huts of the negroes by burrowing into the thatch formed of thick reeds whilst fresh, and the cocoons of Saturnia Mimosæ are described as being perforated with minute holes. They are used as tobacco-boxes by the natives, and cannot be wound off.

The first and second livraisons of the 'Boustopfen voor enne fauna van Nederland,' by Herklots, assisted by other zoologists, contains the following memoirs: —

1. List of the Lepidoptera of Holland, by De Graaf, (864 species, many of which have not been detected in Belgium).

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2. The Tenthredinidæ and Siricidæ of Holland, by Snellen van Vollenshoven, (115 species).
3. Identification of the European Lepidoptera figured by Roesel, by Herklots.
4. The Libellulidæ of Holland, by Herklots.

M. Mulsant has published, under the title of 'Opuscules Entomologiques,' 1r cahier, a series of papers on new insects of different orders, chiefly natives of the South of France, namely, a new genus of Brachelytra, observations on Pentodon Monodon, &c., 21 new species of Homalota, new species of a considerable number of detached genera, a note on the history and transformations of Chrysomela diluta, a new genus of Cistelidæ allied to Allecula, with its larva, a new genus allied to Telephorus, a considerable number of reputed new species of Heteroptera,* and several species of Anthrax, one being described as parasitic in the chrysalis of Argiopis Aprilina.

Descriptions of a considerable number of Spanish insects (most of which had however been already published in the 'Annales' of the French Entomological Society) have been published by M. Graells in the 'Transactions of the Royal Spanish Academy,' Vol. i.

A memoir by Oswald Heer, on the Entomology of the Upper Alps, near Zurich, with descriptions of some Aptera and Coleoptera found on them, appears in the 'Zurcherische Jugend,' (47 Stuck.)

A Synopsis of the Diptera, Lepidoptera, and Apidæ of Nassau, is given in the 'Annals of the Natural History Society of Nassau,' for 1851, Heft 7.

Middendorff, 'Zoologie von Sibirien-Wirbellose-Thiere—Insecten.' 4to., Petersb. 1851. (I have not seen this work).

A notice of Mr. Haldeman's descriptions of several new and interesting animals is given in Guérin's Rev. Zool. 1852, p. 348. The species described are Cecidomyia Robiniæ (with its transformations), Æonja Ebenina (a fossil Crustacean), Apus affinis from the Rocky Mountains, and on the identity of Atops trilineatus with Triarthrus Beckii.

Mr. F. Smith has contributed some notes on the habits of Osmia parietina, Saperda populnea, Attelabus curculionides, Scolytus destructor and its parasites, Ptilinus pectinicornis and its parasite, and Hylæus, (Trans. Ent. Soc. Lond. n. s. ii. 81).

Mr. Logan's Report made to the Royal Physical Society of Edinburgh on the Lepidoptera of Scotland, notices twelve species new to the Edinburghshire Fauna. Mr. Andrew Murray has also made a similar Report on the Coleoptera.

Miscellaneous Notices.—Mr. Curtis has communicated some notes on the supposed comparative rarity of male over female insects, instancing the fact of no males of the pale variety of Colias (C. Helice) being known, nor had he seen any males of the supposed unicolorous variety of Scæva pyrastri, (Proceed. Ent. Soc. Sept. 1852).

An extract from the Appendix to Sir James Ross's Voyage, on the power of insects of resisting cold to an extreme extent, with other notes on Arctic insects, have been communicated to us by Mr. Curtis, (Proc. Ent. Soc. Jan. 1852).

Several specimens of insects and spiders, brought from the Arctic regions by Mr. Ede, have been exhibited to us by Mr. A. White, (Proc. Ent. Soc. Dec. 1851).

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* The new genus Mesovelia, referred to the Amphibicorisa, appears to me to be Geocorisous, and to be closely allied to Anthocoris.

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The impalement of insects upon thorns has again been brought before the notice of the members of our Society (Proceedings, April and September, 1852),* from which it is evident that in some instances at least they are not placed in such situations by birds.

M. Davaine has noted the occurrence of a species of Mermis, one of the intestinal worms, in a specimen of Amara similata, (Ann. Soc. Ent. France, 1851, cxiii.)

Practical Notes.—An apparatus for destroying mould on insects by the vapour of boiling spirits of wine, discovered by M. Victor Ghiliani, of Turin, has been communicated to us by Mr. Curtis, (Trans. Ent. Soc. n. s. ii. p. 19).

An effectual modification of the use of sugar as a bait for nocturnal Lepidoptera, viz., by dipping pieces of coarse cloth in the solution, and hanging them on bushes, has been communicated to us by Mr. Winchester, (Proc. Ent. Soc. October, 1852).

M. Bellier de la Chavignerie has communicated to the Entomological Society of France an excellent plan for collecting moths, by suspending cords smeared with honey and water between trees, to which the moths are attracted by myriads, (Ann. Soc. Ent. Fr. 1851, civ.)

A plan for capturing moths by the employment of rags dipped in putrid soap-suds, as practised in Western Canada, has been communicated to us by Mr. S. Stevens, from information received from Mr. G. Bush, (Proceedings, June, 1852).

A plan of rearing Micro-Lepidoptera in jam-pots covered with glass tops, the food stuck into water in phials, inside the pots, is given by Mr. Douglas, Zool. 3494.

A note by Mr. Edwin Brown describes a new mode of killing minute insects by placing them in small glass phials, which are to be plunged for a moment into boiling water; likewise the description of a new kind of breeding-cage, and on killing large insects by holding them in the steam of a boiling kettle, (Zool. April, 1852).

Mr. Barron has also published a note on the mode of destroying insects with chloroform, (Ibid.)

A note by Mr. Scott recommends collecting insects in moss on fir-stumps in winter, (Ibid. May); likewise a note on the use of bruised laurel-leaves for killing insects, by Mr. Walcott, (Ibid.)

A novel plan for collecting insects is suggested by Bremi (Entomol. Zeit. Stettin, May, 1852), viz., to examine the excrement of toads, which often contains the entire bodies of beetles &c., occasionally still alive.

A plan of preserving spiders by immersion in weak spirit within small glass phials, is given by Mr. Meade, (Zool. December, 1852).

An excellent series of directions for making and preserving microscopical preparations, by Mr. Harteg of Utrecht, is given in the Ann. Nat. Hist. October, 1852.

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* In the instance of the humble-bee observed by myself at Boulogne, instead of being blown on to the reed by the wind, as stated in the 'Proceedings' (p. 27), the insect had evidently been impaled whilst stemming against the breeze with all its power, in order to regain the land, the point of the reed being directed towards the sea. Mr. Hogan has recorded a nearly similar instance occurring in a specimen of Anomala Julii, (Zool. 3493).

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Coleoptera.

Coleoptera in general. — The 2nd volume of the Coleopterous portion of M. Chenu's useful 'Encyclopédie d'Hist. Nat.' has appeared, with very numerous figures.

The 'Catalogus Coleopterorum Europæ,' edited by Dr. Schaum, and published by the Entomological Society of Stettin, is far more complete than any previously published. The Ural Mountains are regarded as the eastern limits of Europe, and the Algerine species are not included, as has been done before in the French catalogues.

Mr. Wollaston has published an interesting article on the geographical distribution of the Coleoptera of the West of England, in the 'Zoologist' for October, 1852.

Captain Godart has published some remarks on the specific distinction of several Cetoniæ and Chrysomelæ, as indicated by the structure of the male organs of generation, (Ann. Soc. Ent. France, 1851, 4 trim.); also on the species of Geotrupes, as defined by the same characters, (Ibid. 1852, x.)

Herr Kiesenwetter has continued his memoir on the Coleoptera collected by himself in the South of France and Catalonia, (Ann. Soc. Ent. Fr. 1851, trim. 4). A number of new species are described, especially amongst the Telephoridæ and Curculionidæ, and a new genus (Trotomma pubescens), established among the Serropalpi.

A critical revision of Erichson's Naturgesch. Käfer Deutschl. by Motschoulsky, is given in the Bull. Soc. Natur. Moscow, 1851, pt. 3. An enumeration of new species of Coleoptera is given by the same author, (Ibid. pt. 4).

Notes upon some Austrian beetles are given by Hampe in the Verhandl. Zool. Bot. Ver. Vienna, Bd. 1.

A list of the Coleoptera of Germany, indicating the localities of each species, by Gustav Zebe, is commenced in the Entom. Zeitung of Stettin for April, 1852, and is continued in the following numbers.

A notice of the Coleoptera of the neighbourhood of Bad-Ems, is published by Fabræus in the Ent. Zeit. of Stettin, June, 1852.

Diagnoses of eight new species of Coleoptera, and a description of Adelops Khevenhulleri (one of the blind cavern-beetles), is given by Müller in the Verhandl. Zool. Bot. Ver. Vienna, Bd. 1.

A notice by Schener on new Austrian Coleoptera, and on the genera Leptoderus and Cymindis, is given in the Verhandl. Zool. Bot. Ver. Vienna, Bd. 1.

An article on the cavern-insects of Carniola, with descriptions of two new species of Leptoderus, is published by Schmidt in the Laibacher Zeitung, No. 146 (August 4, 1852), and also in the Entomol. Zeit. Stet. Nov. 1852.

A memoir by Mannerheim on rare Finnland Coleoptera, appears in the Entomol. Zeit. Stett. for July, 1852.

A memoir by Signor Passerini on Bostrichus Fici, Apate sex-dentata, Morimus lugubris, Nemosoma elongata, Lachnea rufipennis, and other species injurious to the fig, together with Denops personatus (one of the Cleridæ), which was also discovered in all its states in burrows of the branches of the same tree, appears in the 'Atti dell Acad. d. Georgofili,' 1851.

Two new species of Histeridæ from Italy and the Levant, and one new species of Cryptocephalus from Sardinia, have been described by M. Truqui, (Ann. Soc. Ent. France, 1852, 1 trim.)

Twenty-five new species of Coleoptera, of different families, natives of the South of Europe and the North of Africa, including a remarkable blind genus of Pselaphidæ

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(Amaurops Aubei) from Sicily, a species of Paussidæ from Tangier (P. Favieri) found under stones in company with small ants, (Ann. Soc. Ent. Fr. p. xxxv.); and a new genus of Eucnemidæ (Harminius castaneus) from Sicily, has been described by M. Léon Fairmaire, (Ann. Soc. Ent. Fr. 1852, 1 trim.)

Two new Australian Buprestidæ have been described by Mr. Murray, (Ann. Soc. Ent. Fr. 1852, 2 trim.)

M. Reiche has published a critical revision of the list of new Abyssinian Coleoptera described by M. Roth, mentioned in my former Address, by which it appears that one fourth of the species had been previously described, that the new genus, Ixodina, is identical with Kirby's Drepanocerus, and that his Eurysternus (!) trogiformis, is Kirby's Onitis ambigua.

A note on the species of Brachelytra, Carabidæ, and Cicindelidæ of Hong Kong, by Mr. J. C. Bowring, has been communicated to us by Mr. A. White, (Proc. Ent. Soc. April, 1852).

A summary notice of the Coleopterous collections made in California by M. Lorquin, has been communicated by M. Buquet to the Entomological Society of France, (Annales, 1852, p. xx.)

Dr. Le Conte has published descriptions of a great number of species of Coleoptera from California, in the 'Annals of the Lyceum of New York,' vol. v. The Heteromera, Histeridæ, Cicindelidæ, Carabidæ, Dyticidæ, Gyrinidæ, Hydrophilidæ, Cleridæ and Pselaphidæ are treated upon in the portions hitherto published.

Cicindelidæ.—An interesting notice by Mr. H. W. Bates, of the habits of the species of Megacephala inhabiting the Amazonian region of South America, with a synopsis of the species and descriptions of several new species,* by myself, appears in the Trans. Ent. Soc. Lond. n. s., ii. p. 49.

Carabidæ.—The Baron Chaudoir has published a continuation of his memoirs on the Carabidæ, Bull. Soc. Natur. Moscow, 1852, pt. i.

Major D'Aumont has mentioned the curious fact that he had found a great number of specimens of Brachinus crepitans devouring a dead adder, (Ann. Soc. Ent. Fr. 1852, cii.)

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* The following notes on some of the species noticed in this article have been communciated to me by the Marquis de la Ferté and M. Reiche.

Megacephala Klugii is considerably shorter than a typical specimen of M. testudinea (in M. De la Ferté's collection), to which it is otherwise exceedingly similar. I can only regard it as a local variety. Obs. — This species differs so much from the other Ammosiæ in the structure of its mandibles, as to require forming into a separate subgenus.

M. Oxycheiloides, *Blanchard, MSS.*, = M. nigricollis, *Reiche, Rev. Cuvier*, 1842, p. 239; the latter name must of course be employed.

M. quadricollis, *Laf.? MSS.* tab. 7, fig. 7, = M. spinosa, *Brullé, in Voy. D'Orbigny, Amér. Mérid.* VI. ii. p. 3, n. 7; but M. Brullé says nothing of the square prothorax or narrow elytra. Mr. Bates's species No. 10, will therefore probably be a new one.

M. laminata, *Perty*, var. = M. Menetriesii, *Mannerh. in Mus. Dejean.*

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M. Mecquerys has recorded the capture of numerous individuals of Plochionus Bonnfilsii (often captured near the sea-ports of France) beneath the stones used as ballast of vessels chiefly trading with the coast of Guinea, thus indicating the probable natural locality of the insect in question, (Ann. Soc. Ent. Fr. 1852, xxiii.)

A note on Calosoma sycophanta by C., in which that beautiful insect is regarded as only a casual visitor to our island, appears on the wrapper of the 'Zoologist' for April, 1852.

M. Deyrolle has communicated a memoir on the species of Carabus natives of Spain, Portugal and Algeria, to the Entomological Society of France, (Annales, 1852, 2nd trim.)

A note by Struck, on Carabus hortensis, is given in the Proceedings of the Nat. Hist. Soc. of Mecklenburg, Heft 6.

Herr Czagl has described some new Austrian Carabidæ in the Verhandl. Zool. Bot. Ver. Vienna, Bd. 1.

A fine new species of Loricera, discovered in Madeira by Mr. Wollaston, has been described by M. Javet under the name of L. Wollastonii, (Ann. Soc. Ent. Fr.)

The Marquis de la Ferté Sénectère has published the completion of his memoir upon the Patellimanous Harpalidæ of Portuguese Guinea (Rev. Zool. 1852, 65), comprising 69 species, 39 of which are new.

M. Lucas has described a remarkable variety of the Algerine Broscus politus, (Annales, 1852, xiv.)

The continuation and completion of M. Jacquelin Duval's excellent monograph 'De Bembidiis Europæis,' has been published in the Ann. Soc. Ent. Fr. 1851, 4th liv. and 1852, liv. 1 and 2. It contains 122 species, described and referred to the genus Bembidium, divided into 17 groups, with 6 species not examined by the author. A remarkable new genus, destitute of eyes, from Bordeaux, is added, named Anillus cæcus, and the Carabus areolatus (G. Lymnæum, *Steph.*) is referred to the Trechides.

Dyticidæ and Gyrinidæ.—The second part of M. Gehin's Catalogue of the Coleoptera of his own collection (Metz, 1852), contains the Dyticidæ and Gyrinidæ.

Staphylinidæ.—A series of synonymical notes on the Staphylinidæ is published by Kraatz, in the Ent. Zeit. Stettin, 1852, t. 446.

Descriptions of a number of new species of Staphylinidæ, chiefly from Georgia in North America and the Cape of Good Hope, are published by Dr. Sachse in the Ent. Zeit. Stettin for April and May, 1852, including a new genus, Stilicopsis, from Georgia. No locality is given to three of the species.

A memoir by Hochhuth on the Staphylinidæ of Russia, with descriptions of some new genera and species, is given in the Bull. Soc. Natur. Moscow, 1851, pt. 3.

A note by Mr. Hogan on the habits of Diglossa mersa, appears in the 'Zoologist' 3464.

A note by Mr. H. George, on an instance in which luminosity was observed in a specimen of Goërius olens, was communicated to the Ent. Soc. Lond. (Proceedings, December, 1851).

Pselaphidæ.—An abstract of Dr. Le Conte's memoir on the Pselaphidæ of North America, appears in the Proc. Ent. Soc. Lond. December, 1851. The views of classification proposed or alluded to in this memoir appear to me to be far too vague for

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adoption, and the proposal to break up the great group of Brachelytra, and to unite the Pselaphidæ and Scydmenidæ into one group, appears to me quite unnatural. Several of the species are recorded as having been taken in company with small ants, but others under the bark of trees; and of the species of Batrisus, it is remarked that in the Northern States scarcely an individual is seen apart from a colony of ants, but in the South they are frequently found under the bark of trees, where no ants are to be found. Several new genera are proposed, one of which comprises a blind species.

Clavicornia in general.—Dr. Leconte has published a memoir on the singular larva at first regarded as a Crustaceous animal, described by De Kay under the name of Fluvicola Herrickii, subsequently regarded as the larva of a genus of Malacoderm Coleoptera, but now stated to be that of one of the Elmidæ, (Proc. Acad. Nat. Sci. Philad. vi. p. 41, Feb. 1852).

A monograph by Coquerel of the genus Potamophilus, comprising 10 species, is given in Guérin's Rev. Zool. 1851, p. 591.

A paper on the genus Cercyon was read on the 7th of January, 1852, before the Royal Physical Society of Edinburgh, by Mr. Andrew Murray, who "has brought almost the whole of Marsham's and Stephens' numerous species within the number of those recognized on the continent."

A memoir by Kraatz on the genus Anisotoma is given in the Ent. Zeit. Stettin, November, 1852.

A note on the carnivorous habits of Necrodes littoralis, and on the varieties with large and small hind legs, by Mr. F. Bates, appears in the 'Zoologist' for February, 1852. A note by C. on the same subject appears on the wrapper of the same work for April.

A revision of the European species of Catops, is given by Kraatz in the Stettin Ent. Zeit. for 1852. Descriptions of 35 species are given, and notes of 8 not seen by the author. A description is added of Aubé's genus Catopsimorphus. Some notes on species of the genus Colon are also added.

A memoir by Kraatz on the genus Cryptophagus is given in the Ent. Zeit. Stettin, July, 1852.

Descriptions and figures of two anomalous Coleoptera found in ants' nests in Algeria, have been communicated by M. Lucas to the Entomological Society of France (Annales, 1852, xxix.), under the names of Oöchrotus unicolor* and Merophysia formicaria.

A description of a fine Indian insect, belonging to the Languriadæ, and named in commemoration of the late Edward Doubleday, Doubledaya viator, is described by Mr. A. White, (Trans. Ent. Soc. n. s. ii. p. 1). The insect evidently belongs to the Pseudo-tetramera, and as Mr. White regards Triacus, with its 4-jointed antennæ, as congenerous with Languria, this new insect cannot be generically separated from the latter.

Histeridæ.—A description of Hister ruficornis is given by Grimm in Ent. Zeit. Stet. July, 1852.

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* Specimens of this insect from Sicily were communicated to me by Mr. Melly, with the name of Pycnidium testaceum, Mus. Berol.

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Cucujidæ and allied Families. — A list of the families Cucujidæ, Brontidæ, Trictenotomidæ, and Passandridæ, with notices of the species in the British-Museum collection, and descriptions of new species, has been published by the Trustees of that establishment. In the Preface, dated November 30, 1851, it is stated that this list has been prepared and the descriptions made by Mr. Frederick Smith.*

Paussidæ.—Descriptions by myself of six new species of Paussidæ, together with a synopsis of the whole of the species, now amounting to 85 in number, have been published in the Trans. Ent. Soc. n. s. ii. 84.

A note by Mr. Thwaites, confirming the crepitating powers of the species of this family in Ceylon, as observed in Cerapterus Westermanni, is published in our 'Proceedings,' July, 1852.

Bostrichidæ. — A notice of the attacks of a small species of Bostrichus upon a Chinese carved vase made of bamboo, was communicated by Mr. E. A. Bowring to Mr. Spence (Proc. Ent. Soc. Feb. 1852), who proposed for the insect the name of B. Bambusæ.

Mr. Douglas also informed us that the same insect has destroyed a case of fans made of bamboo, imported from China two or three years since, (Proc. Ent. Soc. July, 1852).†

Ptinidæ.—M. Guérin-Méneville has described two new species of the genus Catorama, the type of which infests preserved tobacco. These are C. palmarum, a species observed at St. Domingo by M. Salle in all its states, and the other, C. Sallei, found by the same traveller in the pods of a plant allied to the Caroubes, (Ann. Soc. Ent. France, 1851, cxv.)

The curious fact that the species of Anobium are able to eat materials which have been saturated with a solution of corrosive sublimate, has been communicated to the Entomological Society of France by M. Amyot, (Annales, 1851, cxv.)

Mr. W. W. Saunders has communicated to the Ent. Soc. Lond. the destruction of some fancy articles made of macaroni by Anobium paniceum, (Proceed. Nov. 1851).

Mr. S. Stevens has reared for several successive seasons Dryophila Anobioides from a broom-stump; and Mr. F. Smith has bred Ochina Ptinoides from an ivy-stump, (Proc. Ent. Soc. March, 1852).

The natural history of Dorcatoma rubens is given by Giraud, in the Verhandl. Zool. Bot. Ver. Vienna, Bd. 1.

Lampyridæ and Telephoridæ.—Dr. Leconte's "Synopsis of the Lampyrides [including the Telephoridæ] of Temperate North America," has appeared in the Proceedings of the Acad. Nat. Sciences Philadelphia, v. 331. 58 species are described as new.

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* In the Ann. Soc. Ent. France, January 20, 1852, it is stated that "M. Chevrolat montre le Catalogue des Cucujus et genres voisins du British Muséum, Catalogue qu'il a redigé, et qui vient de paraitre à Londres."

† This insect is very closely allied to, if not identical with, Bostrichus minutus, *Fab. Oliv.*, v. 4, Bostrich. pl. 2, f. 12.

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Major D'Aumont has recorded the curious fact of the pupa of Lampyris noctiluca having the power of emitting light at will, (Ann. Soc. Ent. France, 1851, cii.)

A new genus allied to Phengodes, remarkable for its very short elytra and elongated intermediate and posterior tarsi, has been described by M. Spinola, under the name of Bœoscelis Osculati, in the account of the voyage of M. Osculati on the banks of the rivers Amazons and Napo, (Guérin's Rev. Zool. 1851, 613).

An excellent monograph of the Malthinides by Kiesenwetter, appears in the 'Linnæa Entomologica,' v. 7. The species are divided into the following genera:—

1. Lobetus, n. g., torticornis. Venezuela.*
2. Lygerus, n. g., latipennis, *Germar.* Georgia, N. America.
3. Malthinus, 14 species, including M. fasciatus, flaveolus, biguttatus, &c.
4. Malthodes, n. g. (with simple mandibles), 44 species. M. sanguinolentus, *L.*; flavo-guttatus (minimus, *Steph.*? nec *Linn.*), &c., the majority being new species, often distinguished by the remarkable structure of the male organs of generation.

Buprestidæ.—An article on the metamorphoses of several species of Agrilus, has been published by M. Perris, in the 'Transactions of the Academy of Lyons.'

Cleridæ.—M. Lucas has communicated to the Entomological Society of France, the description of the larva of Thanasimus formicarius, found under the bark of Pinus sylvestris, attacked by Dendroctonus piniperda and Pissodes notatus, upon the larvæ of which it feeds, (Annales, 1852, v.)

Passalidæ.—A catalogue of the species of Passalidæ, with indications of those contained in the British-Museum collection, and descriptions of several new species, with figures, by Mr. F. Smith, has been published by the Trustees of the British Museum, (1852).†

Lamellicornia. — Two new species of Dynastidæ have been described by M. Reiche, (Guér. Rev. Zool. 1852, p. 21).

A number of species of Lamellicorn beetles possessing exserted mandibles and labrum and 10-jointed antennæ (fam. Geotrupidæ and Trogidæ), are described by myself (Trans. Ent. Soc. Lond. n. s. ii. 59).

A memoir by an anonymous writer on the species of Geotrupes allied to G. stercorarius, appears in the Ent. Zeit. Stettin for September, 1852.

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* This is the insect known in the French cabinets under the name of Streptotoma Sallei, *Guér.*

† I take this opportunity of mentioning that the description of P. Goryi (sp. 75) was by the late Mr. Melly, being as I believe the only entomological article which he published. This escaped my memory in drawing up my last year's Report. I must also mention that sp. 78, P. bihastatus, was published by Percheron under that name in 1844, not 1834, but that it had been described by myself, in the 'Annals of Natural History' for 1841, under the name of P. fronticornis, which has of course a priority of several years.

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A memoir on the Australian species of Bolboceras by myself,* with a supplement containing the descriptions of a considerable number of species, chiefly Indian, belonging to the same genus, has been published in the 'Transactions of the Linnean Society,' xxi. pt. 1.

A note on the habits of Trox sabulosus by Mr. F. Bates, states that he obtained many specimens beneath dead rabbit-skins, and that they bury portions of the skin in the same way as the burying-beetles, (Zool. February, 1852).

Mr. W. W. Saunders has published the descriptions of some new Chinese species of Cetoniadæ, including a new genus allied to Dicranocephalus (preceded by some general observations on the Entomology of China), Trans. Ent. Soc. Lond. n. s. ii. p. 26.

A paper on Cetonia græca, *Brullé*, as the type of a new genus (Heterocnemis), by Herr Albers, appears in the Stettin Ent. Zeit. for February, 1852.

Lucanidæ.—Two fine species of Lucanidæ have been described by M. Reiche, (Guér. Rev. Zool. 1852, p. 23).

Blapsidæ.—M. de Beauregard has communicated to the Entomological Society of France, the fact that in Spain an infusion of specimens of the genus Akis is given in cases of pulmonary phthisis. The peasants near Grenada seeing him employed in collecting these insects, regarded him as an apothecary, and taught him the use of the insects mentioned above. (Annales, 1852, v.)

Anthicidæ. — A note of the Marquis de la Ferté Sénectère's monograph on the Anthicidæ, by M. Reiche, appears in the Ann. Soc. Ent. France, 1852, 2nd trim.

Curculionidæ. — Mr. Walton has continued his memoirs on this family, by the description of Trachodes hispidus (from the New Forest and Cumberland), and Acalyptus Carpini (from Fenny Stratford), both new to the British Fauna, (Ann. Nat. Hist. March, 1852).

M. Laboulbène has discovered galls at the crown of the root of Draba verna, inhabited by the larvæ of one of the Curculionidæ and its parasite. (Ann. Soc. Ent. Fr.)

Memoirs by M. Perris on the transformations of the genera Cionus, Phytonomus, and Phytobius, have been published in the 'Proceedings' of the Linn. Soc. Lyons.

A note on the injury committed by Otiorhynchus raucus by gnawing the leaves of the pear, has been communicated to the Entomological Society of France by M. Rouget. Hitherto the attacks of weevils in France had only been observed in the gnawing off of the young buds by species of Rhynchites and Phyllobius, (Annales, 1852, xxxv.)

The crop of strawberries in the neighbourhood of Paris in the summer of 1851, was greatly injured by the attacks of Anthonomus Rubi, *Herbst*, which eat through the stalks of the fruit-buds. The insect is known to the gardeners by the name of *Lisette*; in some situations, "champs entiers n'ont rien produit," (Lucas, in Ann. Soc. Ent. France, 1851, cxv.)

M. Guérin Méneville has observed that a species of Gymnaëtron pierces the stems

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* I have to thank M. Reiche for the following note: —

Bolboceras Lecontei, *Dej.*, = B. furcicollis, *Castelnau*, and = ♀ ferrugineus, *Pal. Beauv.*, and is a native of North America.

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of the roots of Antirrhinum Linaria, causing an excrescence; and that the pith of Alcæa rosea is burrowed into by a species of Apion. (Ann. Soc. Ent. Fr., 1851, clf).

Scolytidæ.—A note on the ravages of Scolyti upon young fir-trees has been communicated by M. Amyot to the Entomological Society of France, (Annales, 1851, cxix.) It is affirmed that the chief injury is committed by the larvæ eating round the stem, and thus preventing the rising of the sap.

A memoir by M. Chevandier on the invasion of a young plantation of pines by Hylesinus piniperda, and on the supposed double-broodedness of this species, was read at the Académie des Sciences on the 5th of January, 1852. This memoir, and the effect of this double-broodedness of Hylesinus piniperda upon the manufacture of charcoal, as well as with reference to remedies to be adopted for the destruction of the insects, has led to several discussions between Messrs. Guérin and Chevandier, the former of whom has published a reply of sixteen pages, followed by the rejoinder of M. Chevandier, in which many interesting facts are developed, in the 'Mémoires de la Société d'Agriculture,' for 1852.

Longicornia.—A revision of the species of Longicorn beetles contained in the Banksian cabinet preserved at the Linnean Society, has been published by M. Chevrolat, (Ann. Soc. Ent. Fr. 1851, 4th livr.)

Dr. Leconte's "Attempt to classify the Longicorn Coleoptera of those parts of America north of Mexico," containing descriptions of great numbers of new genera and species, has been completed in the 'Journal of the Academy of Nat. Sci. Philad.' n. s. ii. pt. 2. The third part, containing the Lamiadæ, is divided into 17 groups and 90 genera.

A number of new species of Longicorn beetles, including 12 from Shanghai, are described by M. Chevrolat in Guérin's Rev. Zool. September, 1852.

A memoir by M. L. Buquet on the genus Eudesmus, consisting of 5 species from South America, appears in Guérin's Rev. Zool. 1852, p. 343.

An account of the habits of the groogroo worm of the West Indies, considered as the larva of a Prionus, and used as an article of food, is published in our 'Proceedings,' for October, 1852.

The destruction of oak timber in Pembroke dock-yard, by the burrowing of the larvæ of Hamaticherus Heros, observed by Sir T. Pasley, has been recorded by myself, with the addition of a note on the structure of the anterior part of the body of Longicorn larvæ in general, with reference to the position of the spiracles, (Proc. Ent. Soc. Nov. 1851).

A notice of the development of large numbers of Obrium minutum from willow-sticks formed into baskets, and also from bramble-sticks, appears in our 'Proceedings,' January, 1852.

A new species of the genus Phacellus is described by M. Buquet in the Rev. Zool. 1851, p. 603.

M. Lucas has described a new Longicorn genus from Algeria (Sympiezocera Laurasii), in the Ann. Soc. Ent. France, 1852, cvii.

Phytophaga.—A memoir by Dr. Leconte, containing a synopsis of the species of Donacia inhabiting the United States, with 6 new species, has appeared in the Proc. Acad. Nat. Sci. Philad. v. 310.

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A monograph of the North American species of Cryptocephalides, by Suffrian, is completed in the 7th vol. of the 'Linnæa Entomologica.' The species here described are divided into the following genera.

1. Cryptocephalus proper, 103 species, with 12 others not seen by the author.
2. Scolochrus, n. g. (Griburius, *Hald.*), 14 species, Cr. scutellaris, *Fab.*; C. equestris, *Oliv.* (larvatus, *Newm.*); and 12 others.
3. Mastacanthus, n. g., 1 new species, M. insularis. Cuba.
4. Pachybrachys, *Chevr.*, 51 American species, including Cr. pubescens, *Oliv.*, *Kby.* (not Fabr.); Cr. viduatus, *Fab.* (not Say); Cr. femoratus, *Oliv.* (sparsus, *Newm.*); and 5 other unseen species.

The transformations of Clythra (Lachnæa) vicina, *Lacord.*, have formed the subject of an interesting memoir by Mr. Lucas, in Guérin's Rev. Zool. 1851, p. 517, with an accompanying plate.

Dr. Rosenhauer has published a dissertation on the development of the genera Cryptocephalus and Clythra, Erlang. 1852.

The sudden appearance of immense numbers of Galeruca Lawsoniæ in Col. Hearsey's garden at Wuzeerabad, where they attacked a plant of Œnothera speciosa, reared for the first time from American seed, is recorded in our 'Proceedings,' for January, 1852. Mr. Douglas, who had once found caterpillars of Cucullia Verbasci feeding upon the Chilian Buddlea globosa (belonging to the same natural order as the Verbascum), suggested that the ordinary food of the Galeruca was some plant allied to the Œnothera.

Coccinellidæ.—An abstract of M. Mulsant's work on the trimerous Securipalpous Coleoptera, by Dohrn and Suffrian, appears in the Ent. Zeit. Stettin, August and September, 1852.

A 'Monografia di Coccinellidei ed Endomichidei del Regno di Napoli,' by Dr. Achille Costa, was published at Naples in 1850, 4to., 112 pages, with 7 plates, containing 41 figures.

Orthoptera.

M. Brisout de Barneville has communicated to the Entomological Society of France, a summary of the Orthoptera of France, amounting to 111 species; viz., Forficulides, 11; Blattides, 8; Mantides, 5; Phasmides, 2; Acrides, 46; Gryllides, 11; Locustides, 28. The Parisian Fauna reaches to exactly half the above number. (Annales, cxx.)

A memoir on the apterous or subapterous species of Orthoptera, by Dr. Fischer, with a supplementary article by Von Siebold, is given in the Ent. Zeit. Stettin for January, 1852. Dr. Fischer has added a valuable series of bibliographical notices of Orthopterous publications.

M. L. Duthier's remarkable memoir on the structure of the ovipositor and its modifications in this order, is noticed in the list of General Anatomical Works given above.

A notice of the destructive powers in houses of Blatta germanica, which indiscriminately attack provisions and other things, living chiefly behind the skirting-board

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of kitchens, has been communicated by me to the Ent. Soc. (Proc. April, 1852). Various remedies against the common cockroach were suggested at the same meeting, and at the May and June meetings.

A memoir by Boll, on the natural history of the mole cricket, is given in the 'Proceedings of the Natural-History Society of Mecklenburg,' Heft 6.

Neuroptera.

Mr. Newman has commenced in the 'Zoologist,' for October, 1852, an article entitled "Proposed Division of Neuroptera into two Classes" [orders], from the character of their metamorphosis; to which (instead of giving new classical names) he has applied the names of Neuroptera, *Linn.*, and Stegoptera, *Dum.*, in senses different from those of their original proposers. The proposal of an eighth class [order] at once overthrows the septenary system: whilst it is equally evident that the formula of the primary divisions of the Insecta Tetraptera given by the author, is at variance with his opening paragraphs, since his Neuroptera ought to enter into the Isomorphous division, and the Stegoptera into the Necromorphous. Of the characters given of these two classes, the only one distinctive of the larvæ is untenable, whilst that of the want of a mouth in the pupa of the Stegoptera is also incorrect, the pupa of Myrmeleon having a mouth quite unlike that of the larva or imago; and the pupæ of Raphidia and Phryganea are active before assuming the imago state.* Neither is the presence of a cocoon constant in the Stegoptera. Again, with reference to the characters of the imago: Perla, Termes, and Thrips have decumbent wings, and Psocus has roof-life wings. Power of flight is denied to Thrips, and the heavily flying Perla is ranked next to Libellula. In the family characters of the Agrionidæ derived from the larvæ, Mr. Newman has erred in respect to one of the most important, describing the breathing-apparatus as internal, whereas in Agrion the branchiæ are external and caudal; and he has omitted one equally important, namely, the possession of ocelli, which are wanting in the larvæ of the Libellulidæ. Lastly, in order to make each of these two classes consist of seven divisions, Agrion is raised to the same rank as Ephemera, Perla, and Termes; and Thrips, with its veinless wings, is now for the first time added to the Neuroptera: whilst Phryganea is added to the Stegoptera. With the exception of these two additions, the propriety of which seems to me very questionable, the two divisions are identical with my two sections, Biomorphotica and Necromorphotica.—(Gen. Synops. p. 46). The exceptional characters alluded to above, are, however, in my opinion, sufficiently important to show the impropriety of raising these two sections to the rank of orders, such as Hymenoptera, Coleoptera, or Lepidoptera.

The first part of the Catalogue of the species of Neuroptera contained in the Collection of the British Museum, by Mr. F. Walker, has been published, containing the Phryganeidæ and Perlidæ.†

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* It is equally incorrect to assert that the motion of these pupæ is similar to that of Ægeria or Hepialus: movement in these is confined simply to a wriggling of the abdominal segments; in the former, the antennæ, legs, and mouth-organs are endowed with powers of motion.

† Acentropus niveus, although affirmed to be Lepidopterous, is admitted into this catalogue, being rejected by the Micro-Lepidopterists.

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Libellulidæ.—An extended revision of the memoir on the European Libellulidæ, by De Selys Longchamps and Hagen, is given by Schneider in the Ent. Zeit. Stettin for June, 1852.

A memoir by M. Léon Dufour on the anatomy* of the larvæ of the Libellulidæ, is published in the 17th volume of the 'Annales des Sciences Naturelles.'

A memoir by De Selys Longchamps, entitled "Resumé Geographique sur les Libellules de l'Italie continentale et insulaire," appears in the memoirs of the Royal Acad. Turin, 2nd ser. tom. xi.

An instance of the ravenous powers of the Libellulæ is given by Mr. Scott ('Zoologist,' October, 1852), a dragon-fly having eaten its own abdomen instead of a butterfly which he had taken out of its mouth.

Termitidæ.—A memoir by Prof. Joly, entitled 'Recherches pour servir à l'Hist. Nat. et à l'Anatomie des Termites,' has been published at Toulouse, and contains a general history of the family and special observations on Termes lucifugus.

An interesting memoir by Dr. Hagen on the natural history and geographical distribution of the Termitidæ, was read before the Phys. Okonom. Gesellschaft of Konigsberg, on the 19th of March, 1852, and has been subsequently printed in the Proceedings of that Society.

A memoir has been published by Dr. Hagen on the natural history of the Termitidæ, ('Uber die Lebensweise der Termiten').

The question as to the nature of the different individuals composing a colony of Termites, upon which so much difference of opinion has prevailed, is alluded to by Mr. Thwaites (Proc. Ent. Soc. January, 1852), who suggests that the two kinds of workers do not undergo any subsequent change.

Planipennia.—A new plan of distribution of the Planipennideous families, with especial reference to their transformations, has been published by Herr Brauer in the Ent. Zeit. of Stettin for March, 1852.†

Hemerobiidæ and Myrmeleonidæ. — A critical revision of recent publications on the Hemerobiidæ, Coniopteryx [or rather, by priority, Coniortes, *Westw.*] and Myrmeleonidæ, by Dr. Hagen, appears in the Ent. Zeit. of Stettin, March, 1852; also upon the Phryganeæ, Ibid. April and May, 1852.

A revision of Schneider's monograph on Chrysopa, by Dr. Hagen, is given in the Stettin Ent. Zeitung for January and February, 1853.

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* In treating upon the respiratory system of these larvæ M. L. D. refers to Mr. Newport's memoir on Pteronarcys regalis (which he attributes to Mr. Newman), considering that the branchiæ of the imago are those of the pupa "obliterées infonconnables, simplement appendiculaires et vestigiaires."

† From information recently received from Dr. Schaum, I am able to state that the remarkable larva figured in my 'Introduction,' ii. fig. 66, 1, and described by Roux under the name of Necrophilus arenarius, referred to by H. Brauer, is the real larva of Nemopteryx, as I had suggested was probably the case. By an unfortunate typographical error, this name is printed throughout Herr Brauer's paper as Neuroptera.

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A memoir by Dr. Hagen on the transformations and anatomy of Osmylus maculatus is given in the 7th vol. of the 'Linnæa Entomologica.'

H. Brauer has published an account of the transformations of Osmylus maculatus in Hardinger's Bericht, vol. vii. Wien. 1851; are published in Wiegmann's Archives, 1851, p. 255.

MANTISPIDÆ.—A memoir by Brauer on the habits and larva of Mantispa pagana, appears in the Archiv. f. Naturg. 1852, Heft. 1, pt. 1. The larva resembles that of Raphidia, but with very long, setiform, straight organs of manducation, thus confirming its affinity with Hemerobius.

A memoir by myself on Mantispa, with descriptions of various new species (the number of species being extended to 46) is given in the Trans. Ent. Soc. Lond. n. s. i. pt. 8.

PANORPIDÆ. — A memoir by Brauer on the larva of Panorpa communis, appears in the Verhandl. Zool. Bot. Ver. Vienna, Bd. 1.

SIALIDÆ.—A memoir on the natural history, metamorphoses and internal anatomy of Corydalis cornuta, by Messrs. Haldemann and Leidy, has been published in the 'Journal of the American Academy,' Boston, 4to., 1848.

STREPSIPTERA.

Another important memoir on the economy of these insects, has been communicated to us by Mr. S. S. Saunders.

HYMENOPTERA.

HYMENOPTERA IN GENERAL. — The Marquis Spinola has published an elaborate treatise upon the Hymenoptera of Pará collected by Ghiliani, in the Mém. Acad. Turin, ser. 2, tom. xiii. The species are accompanied by critical notes on the genera and on the species already described. Several new and highly interesting genera are described.

Memoirs upon the larvæ of Tenthredinidæ which eat the parenchyma of cherry-leaves; and on a new species of Alyson and one of Prosopis, together with some notes on the pollen-masses of Orchidaceæ observed occasionally on the heads of bees, are published by Gorski in his Analecta Berol. 1852.

Herr Foerster has published five decades of a century of new Hymenoptera, in the Correspond. Blatt d. Natur. Vereins d. Preuss. Rheinl. 1851.

A series of notices on the Tenthredinidæ, Fossores and Cynipidæ of the neighbourhood of Herrstein, with descriptions of new species, by Tischbein, appears in the Ent. Zeit. Stettin, for April and May, 1851.

TENTHREDINIDÆ.—A note by Herr Kollar on Tenthredo Cerris, is published in the Verhandl. Zool. Bot. Ver. Vienna, Bd. 1.

The description of a new species of saw-fly (Selandria Robinsoni), the larvæ of which devour the leaves of the Solomon's seal (*Convallaria multiflora*), has been published by Mr. Curtis (Trans. Linn. Soc. xxi. pt. 1); to which is added a plan of division of the Selandriæ, established on the number of the cells of the hind-wings.

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'Notice sur une espèce d'Hyménoptère du genre Nematus,' 8vo., with 2 coloured plates, by M. Leduc. (I have not seen this memoir).

Siricidæ.—A note by Mr. Lubbock upon the injury done to larch trees by Sirex duplex, and on the proportion of females to males, which was as 1 to 100, appears in the Proc. Ent. Soc. March, 1852.

Parasitic Hymenoptera.—Three hundred species of parasitic Hymenoptera, belonging to the Ichneumonidæ, Chalcididæ and Proctotrupidæ, are described by Ratzeburg in the 3rd and last volume of the 'Ichneumonender Forst-Insecten.' We have here to complain of the want of Latin diagnoses of the species. (4to. Berlin, 1852).*

A paper by Mr. Newport, entitled "The Anatomy and Development of certain Chalcididæ and Ichneumonidæ compared with their special Œconomy and Instincts, with description of a new genus and species of Bee Parasites," has been published in the Trans. Linn. Soc. xxi. p. 1. The chief physiological facts comprised in this paper are:—1. That under every form of body, and of each individual organ, the special anatomy of a species is an index to its natural history and economy, (a fact which I thought John Ray had fully proved). 2. That the apodal parasitic larvæ of Hymenoptera repeatedly throw off the outer covering of their bodies. And 3. That the digestive apparatus of these larvæ is at first a simple bag, rounded and closed at its larger extremity, with an imperforated intestine proceeding from it, without an anal outlet; but that as the larvæ approach maturity, the digestive apparatus becomes elongated, the cœcal extremity of the sac becomes perforated, the cells separating in the axis of the column to form a tube, an anal outlet being also formed. The species described in illustration of these facts are two Chalcidideous insects; 1, termed by Mr. Newport Anthophorabia retusa,† and 2, Monodontomerus nitidus, and one Ichneumonideous species, Paniscus virgatus.

A note by Mr. F. Smith, on the parasitic habits of Monodontomerus, in reply to Mr. Newport's statements in the 'Transactions of the Linnean Society,' appears in our 'Proceedings' for June, 1852.

Mr. Walker has published descriptions of seven new exotic Chalcididæ from the British-Museum collection, including a new genus, Chalcidectus, allied to Eupelmus, but with thick hind-legs, Ch. maculicornis, from Pará.

M. Boyer de Fonscolombe's descriptive catalogue of the Ichneumonidæ found near Aix, in Provence, containing the genera Mesostenus (3 sp.) and Hemiteles (24 sp.), has been continued in the Ann. Soc. Ent. Fr. 1852, 1 trim.

A case in which a number of larvæ of a species of Ichneumon made their way out of the body of a newly developed imago of Deilephila Vespertilio, is recorded by M. Bellier de la Chavignerie, (Ann. Soc. Ent. Fr. 1852, xvi.)

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* The insect described and twice figured as Dendrocerus Lichtensteinii, = Cerapteron Halidayi, *Curt.*; Hadroceras (Calliceras, *Nees*) = Ceraphron typ., *Jur.*; Coccobius = Coccophagus, *Westw.*; Eusandalus = Calosoter, *Wlk.*; and Ophioneurus is one of Mr. Haliday's genera of Trichogrammini.

† This insect is congeneric, if not identical, with my Melittobia Audouinii. Being in possession of M. Audouin's observations on this and several other bee-parasites, and having obtained additional materials relative to the subject, I purpose giving them to the Linnean Society on a future occasion.

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Fossores.—A memoir by Prof. Wesmael, being a critical revision of the fossorial Hymenoptera of Belgium, appears in the 'Proceedings of the Royal Academy of Brussels,' for November, 1851, and April, 1852.

A description of a new species of Sphex by Kollar (Sph. cairensis) is published in the 'Proceedings' of the Vienna Academy.

A series of "Mélanges Entomologiques" has been published by M. Léon Dufour, upon the sexes of Mutilla arenaria, upon Macrocera ruficollis, upon Eucera grisea and upon Eucera numida.

Formicidæ.—An interesting paper by Mr. G. Daniell, on the habits of the house-ant (*Myrmica domestica*, Shk.), and on its employment for preparing small skeletons of Vertebrata, was read at the Linnean Society on March 6, 1852, and is published in the 'Annals of Natural History' for December, 1852.

An excellent illustrated memoir by Oswald Heer, on the house-ant of Madeira (*Œcophthora pusilla*, H.), appears in the 'Zurcherische Jugend' for 1852, (54 Stuck). The author describes two classes of workers. The larger, or soldiers, with large heads, agree with my genus Solenopsis (Ann. Nat. Hist. vi. 86), except in the number of joints of the antennæ and form of the mandibles. The males are remarkable for possessing 17-jointed antennæ.

M. Guérin Méneville has described the nest of a species of ant (*Myrmica Sallei*) found in St. Domingo, by M. Salle, suspended upon trees, and formed of a papyraceous substance, like that of the nest of European wasps. Another species of Myrmica (*M. cariniceps*) was also found in the nest. (Rev. Zool. 1852, p. 73).

The 'Irish Sunday-school Magazine' for 1851, contains an excellent summary of the natural history of ants, by Mr. Haliday.

A memoir by M. Guyon, "Sur l'emploi hémostatique du Nid de la Fourmie bi-épineuse," was communicated to the Académie des Sciences, June 28, 1852. The nest of Formica fungosa, formed of materials collected from the capsules of various species of Bombax, is similarly employed in Surinam.

Vespidæ.—The publication of an important monograph on the solitary species of wasps, by M. De Saussure, has been commenced. The parts already published contain the following genera:—1. Raphiglossa, *Saund.*, 3 sp. 2. Stenoglossa, 1 sp. (Rhaph. Odyneroides, *Saund.*) 3. Gayella, 1 sp. 4. Elimus, 1 sp. 5. Zethus, 25 sp. 6. Calligaster, 2 sp. 7. Discœlius, 5 sp. 8. Eumenes, 62 sp. 9. Pachymenes, 5 sp. 10. Synagris, 12 sp. 11. Montezumia, 14 sp. 12. Monobia, 6 sp. 13. Monerebia, 2 sp. 14. Rygchium, 27 sp. 15. Odynerus, 90 sp. The plates illustrating this work are excellent.

A new genus of Vespidæ (Ischnogaster) connecting Synagris and Eumenes, containing three species, from Java and New Grenada, together with the nest of one of the species, has been described by M. De Saussure, (Ann. Soc. Ent. Fr. 1852, i.)

Some interesting notes by Mr. F. Smith, on the economy of Vespa Norvegica and V. rufa, on the parasites of wasps' nests and on the distinction of the species by the organs of generation of the males, appear in the 'Zoologist,' 3699.

A number of new species of Hymenopterous insects, chiefly Vespidæ and Apidæ, from China and Northern India, have been described by Mr. F. Smith, in Trans. Ent. Soc. Lond. n. s. ii. pp. 33, 45.

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Apidæ. — Nylander has published a "Supplementum adnotationum in expositionem Apum borealium," in the 'Annals of the Academy of Stockholm.'

Mr. F. Smith has published a note on cocoons of an Osmia inclosed in a shell of Helix aspersa, Zool. 3498.

A note by Mr. S. S. Saunders, proving the non-parasitism of the genus Hylæus, appears in our 'Proceedings,' April, 1852.

A note on the nests of Andrena, and a suggestion as to the separation of the male and female cells in the colony, appears on the wrapper of the 'Zoologist' for September, 1852.

Mr. H. W. Newman has published some additional notes on the habits of Bombi, in reply to Mr. F. Smith, (Proc. Ent. Soc. December, 1851). He has likewise published an extended series of notes on the habits of the same insects in the 'Cottage Gardener.'

A note on the employment of the juice of the honeysuckle as a means of neutralizing the stings of bees, by M. Gumprecht, appears in the 'Chemical Gazette,' (Gard. Chron. 1853, p. 71).

Bee Culture.—A considerable number of articles by Messrs. W. H. Payne, H. W. Newman, a Country Curate, and other writers, upon bee-culture, have appeared in the 'Cottage Gardener.'

Mr. Golding has communicated to the Entomological Society of London, a piece of honey-comb consisting of brood cells, in the midst of which a royal cell had been formed; the hive having previously lost its queen. Mr. Golding, in order to test the correctness of Huber's statement as to the power of the worker bees to raise a new queen from worker-grubs, had placed in the hive this piece of comb, which then contained only worker-cells. A young queen had been hatched from the royal cell thus formed in thirteen days, and in thirteen more, eggs and young larvæ were found in the hive. The success of the experiment was therefore complete, and afforded an instance of the facility afforded to apiarians by the use of hives having movable leaves or bars.

A paper by Mr. O. Pickard-Cambridge appears in the 'Zoologist' for January, 1853, attributing the supposed attacks of robber bees upon a hive, with its attendant confusion and bustle, to the hurrying away of the inhabitants from a hive infested by the larvæ of the honey-comb moth, which leads them to quit it in disgust, carrying off the honey with them to a new and more suitable abode. As, however, the whole honey of a hive is sometimes removed in the course of a day or two, and as the bees cannot, in so short a time, have built fresh comb, they must, if the supposition be correct, take up their abode in some neighbouring hive, which surely cannot take place. On the contrary, I have myself, in cases of attacks of robber bees, powdered the invaders with flour, and traced them home to a neighbour's apiary.

Mr. Filleul has recorded the acceptance by a hive destitute of a queen, of a strange queen, (Zool. October, 1852).

A plan of keeping bees in hives constantly exposed to the full light of day, has been announced as eminently successful, by Mr. Langstroth, in the 'North American and U. S. Gazette' (Zool. January, 1852), thus disproving the ordinary opinion that bees require the exclusion of light from their abodes. This announcement has led to considerable discussion in subsequent numbers of the 'Zoologist,' in which the ordinary opinion is generally maintained and proved by Messrs. H. W. Newman, Filleul, and Bevan.

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Heteroptera and Homoptera.

Rhyngota, *Fab.*—An extended memoir by the Marquis Spinola, on the classification and genera of the Rhyngota, or suctorial Hemiptera of Linnæus, exclusive of the Aphidæ and Coccidæ, together with the descriptions of a considerable number of new genera and species of exotic Heteroptera and Homoptera, has been published in the 'Transactions of the Society of Sciences of Modena,' tom. xxv.

A considerable number of new Swedish Rhyngota are described by Bohemann in the Kongl. Vet. Acad. Förhandl. for 1852.

Homoptera.

Geocoriss.—The second part of Mr. Dallas' excellent 'Catalogue of the Heteroptera contained in the Collection of the British Museum,' has been published during the past year. Its execution is fully equal to that of the preceding part: it comprises the Coreidæ and allied groups.

A rectification of the nomenclature of various species of Heteropterous Hemiptera occasioned by the publication of Mr. Dallas' catalogue of the British-Museum collection, is given by M. Signoret in the Ann. Soc. Ent. France, 1851, p. cviii.

Ten new species and a new genus of Heteroptera from Gothland are described by Dahlbom in the Trans. Royal Acad. Sweden.

A number of new exotic species belonging to the tribe Scutata, have been described by Mr. Dallas, (Trans. Ent. Soc. n. s. ii. p. 6); including also some notes on my genus Urostylis, which is raised to the rank of a separate family.

A monograph of the Scutelleridæ, Pentatomidæ and Coreidæ of the South-western part of Russia, is given by Gorski in his Analecta (Berlin, 1852), together with the description of a new genus allied to the Capsidæ, destitute of hemelytra, and resembling an ant, (genus Myrmecoris).

Dr. Fieber has published monographs of the Pentatomous sub-family Sciocoridæ, comprising the genera Dryptocephala (7 sp.), Oncodochilus (1 sp.), Sciocoris (24 sp.), Discocephala (8 sp.), Macrothyreus (1 sp.), Paramelus (1 sp.), and Sephela (1 sp.); of the genus Oxycarenus (belonging to the Lygæidæ, with 16 species), and of the Notonectideous genera Bothronotus (4 sp.), Notonecta (9 sp., with an appendix of doubtful species), Anisops (8 sp.), 4to., 1851, from the Trans. Roy. Soc. Bohemia.

A monograph of the European species of the genus Ælia, by Kuster, appears in the Ent. Zeit. Stettin, Nov. 1852.

Some remarks on the synonymes of the British species of the genus Acanthosoma, in reply to Mr. Dallas, were published by Mr. Curtis, (Trans. Ent. Soc. Lond. n. s. i. p. 271).

A curious Hemipterous insect from Sylhet, with elytra only of the length of the scutellum, is described by Mr. Dallas (Ann. Nat. Hist. November, 1852), under the name of Atelides.

A further note by Mr. Dallas describes the sexual distinctions and larva of Atelides centrolineatas, (Ann. Nat. Hist. December, 1852).

A note by T. Hill, on the habits of Ploiaria brevipennis, has been published in the 'Proceedings of the American Association for the Promotion of Science,' iv. 347.

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Hydrocorisa.—Dr. Fieber has published 'Genera Hydrocoridum secundum ordinem naturalem,' &c., with 4 plates, (4to., Prague, 1851).

A monograph of the genus Corisa, containing descriptions of 51 species, with a supplement of 20 unascertained species, has been published by Dr. Fieber, (4to., Prague, 1851, from the Trans. Roy. Bohemian Soc.)

A flight of a cloud of specimens of a large species of Belostoma, taken on board a ship in the Persian Gulf, is recorded by Mr. A. White, (Proc. Ent. Soc. Lond. March, 1852).

Homoptera.

The fourth part of Mr. Walker's 'Catalogue of the Specimens of Homopterous Insects in the Collection of the British Museum,' or, more correctly speaking, a list of all the hitherto described species of the order, with descriptions of the new species in the British Museum, has appeared, containing the families Psyllidæ, Aphidæ, and Coccidæ, with a supplement of additional species of Homoptera, and an admirable appendix by Mr. Haliday on Thrips and its divisions, here raised to the rank of "Order III. Physapoda."

Thirteen new species belonging to different families are described by Dahlbom in the Trans. Roy. Acad. of Sweden.

Cicadidæ.—A memoir by Mr. Scott on the habits of the Australian insect, Cyclosoma Saundersii, with a description of both sexes (the male only having been previously known), was read at the Zoological Society on the 10th of February, 1852.

Some notes by Mr. Ph. Wild, on the sudden appearance of millions of specimens of Cicada septendecim in the neighbourhood of Baltimore, on the 18th of June, 1851, appear in the Ann. Soc. Ent. France, 1852, xviii.

A new species of Cicada, hitherto confounded with C. septendecim, has been described by I. C. Fisher, in the Proc. Acad. Nat. Sci. Philad. v. No. 11.

A monograph on the genus Æthalion, comprising 14 species, natives of Tropical America, by M. Signoret, appears in the Ann. Soc. Ent. Fr. 4th trim.

Both sexes of the remarkable Uroptera Hardwickii, with other insects, have been brought from the Himalayas by Dr. Hooker. Mr. White has recorded that the remarkable elongated appendage at the extremity of the body exists in both sexes, in the Proc. Ent. Soc. April, 1852.

M. Guérin Méneville has described a new species of Iassus (I vastator), which sometimes attacks the young plants of wheat and barley to such an extent as to cause the crop of the latter plant materially to be diminished, whilst that of the former was in one case "nulle." Acad. des Sciences, Jan. 19, 1852; Rev. Zool. 1852, p. 43.

Aphidæ.—M. Léon Fairmaire has published a note on the habits of a new species of Schizoneura, found near Paris at the roots of a species of grass of the genus Setaria. (Ann. Soc. Ent. France, 1851, cvii.)

A paper by the Rev. J. Thornton, on the pupa of an insect [allied to Cionops], with leaf-like appendages, which had been proposed to be named Phillophorus testudinatus, was read at the Microscopical Society on the 28th of January, 1852, in which the writer considers that it is the pupa of an undescribed species of Aphis, forming a

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new species, if not a new genus. It is found in its different states on the leaves of Acer campestris.

Coccidæ.—A memoir by M. Dujardin on the establishment of a new order for the reception of Coccus, has appeared in the 'Comptes Rendus.'

A memoir by Dr. Landerer on Coccus Ilicis, has been published in the 'Pharmaceutical Journal,' (Vol. xi. No. 12, June, 1852); of this useful insect it is stated that upwards of 40,000 lbs. weight are annually collected in Greece.

M. Guérin Méneville has communicated to the Académie des Sciences (March 1, 1852), a notice of his discovery of a species of Coccus upon the common bean of the South of France (C. Fabæ, *Guér.*), capable of affording a supply of colouring matter, (Rev. Zool. 1852, p. 143). A report by M. Chevreuil on the analysis of Coccus Fabæ, with reference to its colouring properties, was made to the Académie on the 11th of May last.

Dr. MacGowan's memoir on the tallow-tree, with a notice of the Pe-la, an insect-wax of China, drawn up for the Agricultural and Horticultural Society of India, has been published in Silliman's 'American Journal' for July, 1851, and Ann. Nat. Hist. August, 1852. It is for the most part compiled from the accounts given in Chinese writers, and notices the curious statement that the insects which remain on the trees through the winter secrete a purple envelope, which attains the size of a hen's head in spring, and in such state these nests are transferred from tree to tree.

Lepidoptera.

M. Léon Dufour has addressed to the Académie des Sciences (May 17, 1852), an abstract of his great forthcoming work on the anatomy of Lepidopterous insects.

A series of observations by M. Bruand, opposing the classification founded chiefly on the veining of the wings of Lepidoptera, adopted by Herrick-Schæffer and M. De la Harpe, in his catalogue of the Swiss Phalænæ, published in No. 22 of the 'Bulletin de la Société Vaudoise des Sciences Naturelles,' with reference to the classification of the Geometridæ, appears in the Ann. Soc. Ent. France, 1852, 1st. trim.

A reissue of Wood's 'Index Entomologicus,' with the nomenclature of the text altered in accordance with the British-Museum Catalogue, is in course of publication.

A bibliographical list of numerous recent works upon the Lepidopterous insects of various parts of Germany, is given by Dr. H. Speyer, in the Ent. Zeit. Stettin for October, 1852.

Freyer's Neue Beitrage z. Schmetterl. has been continued by the publication of Hefts 94—100.

The first volume of the Lepidoptera in M. Chenu's 'Encyclopédie d'Histoire Naturelle' has appeared, comprising the Diurna and Crepuscularia, *Latr.*, with numerous figures.

M. Bellier de la Chavignerie has published (Ann. Soc. Ent. France, 1851, 4th trim.) a list of the Lepidoptera observed in the department de la Lozère, not included by Duponchel in his memoir published in the 'Annales,' 1st series, tome iii.

A memoir by Dr. Boisduval upon the Lepidoptera of California, containing 83 species of Diurna, 2 of Sphingidæ, and 10 Bombycidæ, appears in the Ann. Soc. Ent. France, 1852, 2nd trim.

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Descriptions of new species of Libythea and Macroglossa, by Mr. Kirtland, have been published in the 'Family Visitor,' Cleveland, Ohio, Nos. 76 and 85.

Some notes on Lepidoptera by Boie, appear in the Ent. Zeit. Stettin, November, 1852.

Descriptions of new species of Russian Lepidoptera are given by Von Nordmann and Eversmann, in the Bulletin Soc. Natur. Moscow, 1851, pt. 4, and 1852, pt. 1.

Diurna.—The 'Genera of Diurnal Lepidoptera,' commenced by the late Edward Doubleday, and continued by myself, with plates drawn by Mr. Hewitson, has been completed.

An illustrated periodical work on the British butterflies, by the Rev. O. Morris, is in course of publication.

A list of butterflies captured in Northamptonshire, with notes of the habits of some species, is given in the 'Zoologist' for February, 1852, by the Rev. W. Bree.

The first part of an illustrated 'Catalogue of the Lepidopterous Insects in the British Museum Collection,' has been completed by Mr. G. R. Gray, and contains the family Papilionidæ, consisting of 367 species, with 120 coloured figures, (large 4to., 84 pp.)

Descriptions of five new species of Papilionidæ from Sylhet and Brazil, have been published by Mr. Hewitson, (Trans. Ent. Soc. Lond. n. s. ii. p. 23).

A considerable number of new exotic species of Papilionidæ and Pieridæ, have been described by M. Lucas in Guérin's Rev. Zool. for March, 1852, and several subsequent numbers.

A memoir by Zeller on the pupation of the genus Thais, appears in the Ent. Zeit. Stettin, June, 1852.

Mr. Hewitson's beautiful work, entitled 'Exotic Butterflies, being illustrations of new Species, selected chiefly from the collections of W. W. Saunders and the author,' has appeared quarterly; the genera illustrated by new species being Eresia, Cybdelis, Epicalia, Acræa, Pieris, and Ithomia, Timetes, Cybdelis, Eubagis, Heliconia, Limnas and Nymphidium.

The 5th volume of the 'Entomographie de la Russie,' by Fischer de Waldheim, containing the Nymphalidæ of Russia by Eversmann (see Preface), with beautiful figures of all the species (except Limenitis Aceris), was published at Moscow in 1851.

Mr. Bates's notes on his captures in South America comprise a few observations on the habits of the splendid Callithea Sapphira, (Zool. 3449).

A notice by Ghiliani of an extraordinary flight of millions of specimens of Vanessa Cardui, on the 26th of May, 1851, has been published in the 'Gazetta Piemontese,' May 1, 1851, and Guérin's Rev. Zool. 1851, p. 559.

A description of the larva of Polyommatus Corydon is given by Zeller in the Ent. Zeit. Stettin, 1852, p. 425.

The Monograph of Lycænidæ by Gerhard has been continued, the 9th Heft containing plates 33—36.

Heterocera. Sphingidæ.—A specimen of the West Indian Sphinx Antæus, reared in the Horticultural Society's Gardens from a pupa imported accidentally with plants from Trinidad, was exhibited to us by Mr. Curtis, (Proceedings, September, 1852).

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TROCHILIIDÆ. — Specimens of Trochilium Culiciforme, reared from larvæ in a stump of birch, with its parasitic Ichneumon, have been exhibited to us by Mr Edwin Shepherd, (Proceedings, June, 1852).

The addition of Trochilium Chrysidiforme to the British fauna, is made by Mr. Stephens, (Zool. February, 1852). Mr. Curtis informs me that he also possesses a British specimen of this beautiful insect.

HEPIALIDÆ.—H. Assman has commenced the publication of a work upon the Lepidoptera of Silesia ('Die Schmetterlinge Schlesien,' Breslau, 8vo.), containing a series of plates, in which the generic characters are given with extreme care. The first part comprises the Hepialidæ. Two volumes of Diurna and Sphingidæ had been previously published in 4to., with gaudily coloured figures of indifferent merit, so that the present publication may be regarded as a distinct work. Figures of the larvæ and pupæ ought however to be added to the generic details.

BOMBYCIDÆ &c.—A continuation of the memoir by Adolf and August Speyer, on the Lepidoptera of Germany, comprising the Lithosiidæ, Arctiidæ, Psychidæ, Drepanidæ, Bombycidæ and Hepialidæ, appears in the Ent. Zeit. Stettin, for August, September, and October, 1852.

M. Guérin Méneville has published the result of his experiments, undertaken in the South of France, with the view of arresting the progress of the attacks of Muscardine upon silk-worms, by the employment of fumigation with certain materials, of which the composition was communicated to the Académie des Sciences in a sealed packet, on the 25th of May, 1851, (Rev. Zool. 1851, p. 528).

A memoir by M. Peligot, entitled "Etudes Chimiques et Physiologiques sur les Vers à Soie," was communicated to the Académie des Sciences on the 3rd of November, 1851, in which the author has entered into long details on the relative weight of the eggs, larvæ, food, silk, &c. (Rev. Zool. 1851, p. 538).

M. de Paravey has presented some remarks to the Académie des Sciences (November 17, 1851), on the ancient Chinese name of the silk-worm, — worm-elephant, or worm from the elephant country; thus proving that the culture of the silk-worm is not indigenous to China, but to the country of which the elephant is a native.

A note on the employment of the common knot-grass (*Polygonum aviculare*) for the food of silk-worms, appears in our 'Proceedings,' July, 1852.

An interesting memoir by M. Chevandier, on the ravages of Orgyia pudibunda in the beech-forests of Western France, has been published at St. Germain.

M. Bellier de la Chavignerie has communicated to the Entomological Society of France (Annales, 1852, xxxv.), a note on the vast multiplication of caterpillars of Bombyx chrysorrhea in the Bois de Boulogne, where the oaks were stripped of their leaves, and the vegetation beneath the trees also eaten. M. Bellier had also observed great numbers of instances of Muscardine amongst these caterpillars. The woods near St. Germain had also suffered from the attacks of the larvæ of the same insect, and of Lithosia quadra, (Ibid. xxxvii.)

A specimen of the singular Lepidopterous insect alluded to in my preceding Report, reared from Coccus-like larvæ infesting the bodies of Fulgora candelaria, has been forwarded to our Society by Mr. J. C. Bowring, of Hong Kong, under the name of Epipyrops anomala, (Proc. Ent. Soc. for March, 1852).

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M. Bruand has published a memoir on the Psychides in the 'Proceedings of the Society of Emulation of Doubs,' in which the author considers that the species form but one group, which should be placed among the Tineides, and that they consist of the four genera Typhonia, Heterogyna, Psyche and Psychoides.

A revision of the British species of Psyche, by M. Bruand, appears in the 'Zoologist,' February, 1852. P. reticella, *Newm.* is new; P. radiella, *Curt.* = pulla, *Esper*; P. nitidella, *Steph.* = intermediella; P. fenella, *Newm.* = opacella, *H.-Sch.*; and P. nigricans, *Curt.* appears to be distinct from villosella.

Three new French species of Psyche are described by M. Boisduval, Ann. Soc. Ent. Fr. 1852. xxii.

A note by Mr. Weaver on the supposed distinction between Sterrhopteryx opacella and specimens reared from cased larvæ found in Scotland, appears in the Proc. Ent. Soc. Lond. November, 1851, and February, 1852.*

LITHOSIIDÆ.—A memoir by Schreiner on Lithosia depressa and helveola, appears in the Ent. Zeit. of Stettin, April, 1852, and a translation thereof by Mr. Douglas, appears in our 'Proceedings' for May, 1852.

NOCTUIDÆ.—M. Guenée having undertaken portions of the great work of M. Boisduval, 'Species générale des Lépidoptères,' has published the descriptions of the Noctuidæ (Noctuelites) in three volumes, containing 2000, with figures of a great number of species. The chief demerit of the work is the want of tabular lists of the genera, and of short Latin characters of species. The preface and introduction occupy 96 pages, of which one half is devoted to a review of the works of preceding Lepidopterists.

A continuation of Heinemann's memoir on the Lepidoptera of Brunswick, containing the Noctuidæ, with notes on the habits and transformations of various species, is given in the Stettin Ent. Zeit. for February, 1852.

A memoir by M. Graslin, upon two new species of Leucania found in the west of France, and on a new species of the same genus from the south of France, has appeared.

GEOMETRIDÆ.—A note by Freyer on Alpine Lepidoptera, with descriptions of several new species of Geometridæ, and a notice of a specimen of Geometra dilucidaria, having the body of a male and the antennæ of a female, appear in the Stettin Ent. Zeit. for May, 1852.

A paper by Zeller, on several new species of Geometridæ, appears in the Ent. Zeit. of Stettin for June, 1852.

A translation of Koch's note on the habits of the caterpillars of Phorodesmia smaragdaria, has been given by Mr. Douglas, (Proc. Ent. Soc. March, 1852).

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* I find no distinction between the males of these two supposed species, and I am not sure whether the tufts of down, spoken of by Mr. Weaver, are not portions of the inner lining of the larva-cases abraded by the action of the body of the female. The two females submitted to me for examination, were too much shrunk up to allow of the question being determined. Had they been placed in spirits there would have been no difficulty in settling the point at issue.

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A note by the Rev. J. S. Henslow on the habits of two species of Eupithecia, appears in the 'Zoologist,' February, 1852.

Some remarks by Mr. Weaver on the species of Oporabia, are given in the 'Zoologist,' 3495.

Tortricidæ.—Mr. Stephens' 'Catalogue of the British Tortricidæ,' with indications of the species contained in the collection of the British Museum, has been published by the Trustees.

Some notes by Mr. H. Doubleday on the nomenclature adopted in Mr. Stephens's 'Catalogue of Lepidopterous Insects in the Cabinet of the British Museum,' appear in the 'Zoologist,' p. 3580. Mr. Stephens's posthumous reply to these notes is given in the same work, p. 3733.

An abstract of Col. Goureau's memoir on the habits of Sericoris (Orthotænia) antiquana, by Mr. Douglas, appears in our 'Proceedings' for June, 1852.

Crambidæ.—Mr. Edwin Shepherd exhibited larvæ of Botys urticalis in their winter quarters under the bark of a post, (Proc. Ent. Soc. April, 1852).

Tineidæ.—The reading of a paper by Mr. Douglas, on the identification of the species of Micro-Lepidoptera whose larvæ mine in leaves, described and figured by Reaumur and De Geer, was commenced at our meeting on the 4th of October last.

A monograph by Zeller on the Tineidæ with elongated maxillary palpi, appears in the 'Linnæa Entomologica,' vol. vi.

A memoir by Zeller on seven new Tineideous genera, is commenced in the 7th volume of the 'Linnæa Entomologica.' These genera form a group of Sacktragers, of which the pupa, in neither sex, is protruded from the pupa-case. They are: —

1. Lypusa, *Z.*, Apalpa, *H.-Sch.*, T. maurella, *W. V.*
2. Talæporia, *Hb.*, 3 species, including T. pubicornis, *Haw.*, and Cochleophasia, C. tessellea, *Haw.*
3. Solenobia, *Dup.*, 6 species, including T. clathrella, *Tr.*
4. Diplodoma, *Z.*, 1 species, marginepunctella, *Steph.*
5. Xysmatodoma, *Z.*, T. melanella, *Haw.*
6. Adela.
7. Nemotois.

Mr. Douglas has read to us a translation of some notes on the larvæ of various Micro-Lepidoptera from the 'Tauschvereins Bericht fur 1848—50,' Proc. Ent. Soc., September, 1852.

Mr. Douglas's memoir on the British species of Gelechia, amounting to one hundred in number, is completed in the Trans. Ent. Soc. Lond., n. s. i. pt. 8.

A note by Mr. Curtis, on the heterogeneous character of the genus Gelechia, and on G. cerealella as an imported insect, appears in our 'Proceedings,' Jan., 1852.

Mr. Douglas communicated to us various illustrations of the natural history of different species of Nepticula and Gelechia, Proc. Ent. Soc. April and June, 1852.

Mr. Douglas has described the transformations and habits of three species of Gelechia and three of Coleophora, illustrated by beautiful figures, in our 'Transactions,' (n. s. ii. p. 75.)*

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* The larva of Coleoph. Alcyonipennella, Pl. xi. f. 2 *a*, is represented as destitute of ventral prolegs, although in a position in which they should have been visible.

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Specimens illustrating the transformations of various species of Tinea, Lithocolletes, Coleophora, Elachista and other Micro-Lepidoptera, were exhibited to us by Messrs. Douglas, F. Grant, S. Stevens, Wilkinson, F. Smith, Waring and others, 'Proceedings,' July, August, September, October, 1852.

Mr. Douglas has recorded the habits of the larvæ of a species of Ephestia, which feed upon dried Turkey figs, (Eph. ficella, Proc. Ent. Soc. November, 1851). The same gentleman has also communicated the curious circumstance that the larvæ of several species of Gelechia feed in different manners upon plants, those of one species, G. costella, indifferently mining the leaves, feeding between leaves drawn together, eating the seeds, or boring into the stems of Solanum Dulcamara, (Ibid).

Mr. Douglas also exhibited specimens of Lithocolletes Carpinicolella, reared in the month of January, by means of heat, from hornbeam leaves gathered in October and November, (Proc. Ent. Soc. Feb. 1852).

Mr. Wilkinson exhibited some larva-cases of a Talæporia found in July, from which females had been produced which had laid fertile male eggs without male intercourse, (Trans. Ent. Soc. Proc. Nov. 1851).

The ravages of the larvæ of Gracillaria Vau-flava upon wine-corks, and the best mode of preventing their attacks, has been the subject of several communications to the Ent. Soc. of London, 'Proceedings,' November, 1851, April, 1852, June, 1852. Mr. Wilkinson has, however, reared this insect from cases formed of the black fungus common in old wine-cellars, on which he believed the larvæ fed, as they had not touched the corks of the wine-bottles in the cellar, (Proc. Ent. Soc. July, 1852).

Mr. F. Smith has also exhibited to us specimens of Œcophora lacteella, reared from wine-corks by Mr. Felkin, and also by himself from the waxen materials of the nest of Bombus Raiellus, ('Proceedings,' August, 1852).

A paper by M. Guérin Méneville on the remedies to be adopted on a large scale to arrest the ravages committed on wheat by the Alucita (Butalis cerealella), was read at the Académie des Sciences on the 1st of December, 1851.

A note upon the ravages of the Alucita which infests wheat, has been communicated by M. Amyot to the Ent. Soc. of France (Annales, 1852, vi.)

A note by Mr. Lowe on the habits of Plutella porrectella, which destroys the tops of the shoots of the double white rocket, and of which there are three broods in a year, is given in the 'Zoologist' for April, 1852.

A synopsis of Mr. Stainton's monograph on Lithocolletis, appears in the Stettin Ent. Zeit. for March, 1852.

An article by Nicelli on Lithocolletis Stettinensis, is given in the Ent. Zeit. Stettin, July, 1852.

Pterophoridæ.—A revision of the Pterophoridæ by Zeller, appears in the 6th vol. of the 'Linnæa Entomologica;' and a translation of such parts thereof as relate to the habits of the larvæ of the different species, is given by Mr. Douglas, Proc. Ent. Soc. April, 1852.

Diptera.

Zetterstedt's classical work on the Diptera of Scandinavia, has been completed in eleven volumes during the past year.

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The third part of the 'Insecta Saundersiana' by Mr. F. Walker has appeared, containing a great number of new exotic species of Therevidæ, Leptidæ, Anthracidæ, Bombyliidæ, Henopidæ, Empidæ, Dolichopidæ and Syrphidæ.

Descriptions of four new species of Diptera from Gothland, have been published by Dr. Dahlbom, 'Transactions of the Swedish Royal Academy.'

Culicidæ.—A method of driving away mosquitoes used by the Chinese, by burning sticks made of the sawings of resinous wood (juniper?), mixed with some combustible substance, is given by Mr. Fortune in his work on the Tea Countries of China, and is copied into our 'Proceedings' for May, 1852.

Tipulidæ.—A memoir on various new species and genera of minute Tipulidæ, by Herr Winnertz, is published in the Stettin Ent. Zeit. for February, 1852.

A memoir on the anatomy and development of the larva of Corethra plumicornis, by Leidig, appears in Von Siebold and Kolleker's 'Zeitschrift,' iii. Bd., Heft iv. *a*.

A monograph of the genus Ceratopogon, by Winnertz, appears in the 'Linnæa Entomologica,' vol. vi.

Asilidæ.—A memoir by Dr. Loew, 'Bemerkingen über die familie der Asiliden," 4to., 22 pp., has appeared at Berlin.

Bombyliidæ.—A description with figures of Bombylius Boghariensis, a new Algerine species, with its transformations, has been given by M. Lucas (Ann. Soc. Ent. Fr. 1852, ii.)

Descriptions and figures of nine new species of Diptera, chiefly belonging to the families Bombyliidæ and Anthracidæ, by Léon Dufour, appear in the Ann. Soc. Ent. Fr. 1852, 1 trim.

Syrphidæ.—Dr. Baird has described the two different kinds of sound emitted by Sericomyia Lapponum, that made during flight being a loud hum or buzzing, and that made when the insect is at rest being "peculiarly shrill, loud and distinct, and clear as that of a musician's pitch-key." The mode in which these different sounds were produced was not ascertained, Proceed. Berwicksh. Natur. Club for 1851, p. 68.

A new genus of Syrphidæ, allied to Milesia, from the South West of Russia, is described by Gorski in his 'Analecta,' (Berlin, 1852), under the name of Tyzenhauzia, as well as a new species of Milesia.

Muscidæ.—My memoir on the Tsetse and other destructive species of flies found in Tropical Africa, has appeared in the Annals Nat. Hist. August, 1852.

A notice of the venomous powers of this insect was communicated by Mr. W. Oswell (who had accompanied Capt. Vardon) to the Académie des Sciences (Comptes Rendus, October 16, 1852, and Annals Nat. Hist. December, 1852). M. Arnaud subsequently made a communication to the Académie, stating that the insect appeared to him to be identical with one found in Sennâr, the bites of which also kill the animals attacked; to prevent which the keepers are obliged to take refuge on the banks of the Nile, where this fly rarely occurs. He had been bitten by this fly, the wound from which lasted more than four months with insupportable pain, ('Comptes Rendus,' 26th of October, 1852, and Ann. Nat. Hist. December, 1852).

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Mr. Douglas (Proc. Ent. Soc. 1852, March) exhibited the larva of a Dipterous insect, voided by a gentleman who had been for a long time in ill health; it was white, naked, attenuated, and destitute of the ciliated appendages possessed by the larva of Anthomyia canicularis.*

A notice by M. Guérin Méneville, presented to the Académie des Sciences, on the effective result of remedies suggested by himself against the ravages of Dacus Oleæ upon the olives in the South of France (sometimes to the extent of six millions of francs in a year), is published in the Rev. Zool. for 1852, p. 146.

A memoir by M. Perris on the metamorphoses of Sarcophaga muscaria, Lucina fasciata, Gymnopoda tomentosa, Opomyza gracilis, and Chyliza atriseta, have been published in the Mémoires Soc. Sc. Agricult. et Arts de Lille, with a plate.

Hippoboscidæ.—A new genus (Megistopoda Pilatei) closely allied to Nycteribia, with extremely long hind-legs, and with the basal joints of all the tarsi of the same length as the second, has been described by M. Macquart, founded upon a species captured on a bat in Mexico, (Ann. Soc. Ent. France, 1852, 2 trim.)

Crustacea.

Malacostraca.—A remarkable memoir by Professor Milne-Edwards, in which he follows out in the Crustacea the views of M. Audouin as to the composition of the thorax, extending them to the comparative structure of all the segments of the body and their appendages, has appeared in the Annales des Sci. Nat. vol. xvi. To all these portions of the body a series of new names is applied.

A memoir on the exuviation of the Crustacea by Sir John Dalyell is given in the 'Report of the British Association,' 1851, p. 120, copied in 'Zoologist,' p. 3490.

Some notes by Mr. P. H. Gosse on the exuviation of the spider crab (*Maia Squinado*), are published in the Annals Nat. Hist. September, 1852.

The eighth part of Professor Bell's 'History of British Crustacea,' containing the Mysidæ and Squillæ, with an appendix of additional species, has appeared during the past year.

A note by Mr. C. Spence Bate on some Crustacea dredged by Mr. Barlee in the Shetlands, is given in the Annals Nat. Hist. Nov. 1852, and contains the description of a supposed new species, Hippolyte Barleei, and a notice of the minute terminal joint of the abdomen in females of Ebalea Pennantii.

A List of the Crustacea of Moray Firth is given by the Rev. G. Gordon, 'Zoologist,' 3678.

The Rev. F. W. Hope has published a 'Catalogo dei Crostacei Italiani e di molti altri del Mediterraneo.'

The Appendix to Dr. Sutherland's 'Journal of a Voyage to Baffin's Bay,' contains a list of the Crustacea collected, including a few new species of Entomostraca de-

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* I possess a very rare tract by M. Marion de Proce, containing a series of observations "relatives à la presence de plusieurs larves d'Œstres dans le canal digestif d'une individu de l'espèce humaine." From the figures appended to the memoir it is evident that the larvæ are not those of an Œstrus, but those of a species of Muscidæ, similar to the specimen exhibited by Mr. Douglas.

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scribed by Dr. Baird, together with some species of Caprella, Nymphon and Pycnogonum, described by Mr. A. White.

Dr. Dana's Conspectus of Crustacea has been continued in the Proceedings of the Acad. Nat. Sci. Philadelph. v., No. 11, comprising the Paguridæ, with descriptions of 15 new species.

A memoir by Fr. Muller on two new species of the remarkable genus Tanais, with figures, appears in the Archiv. f. Naturg. v. 18 Heft. i.

ENTOMOSTRACA.—A monograph of the Apodidæ, containing 5 species of Apus (1 new, from St. Domingo), and 3 species of Lepidurus, and descriptions of two new species of Cypris, was read at the meeting of the Zoological Society on the 13th of January, 1852.

A monograph of the Branchipodidæ, containing a new genus and a new species from St. Domingo, together with descriptions of two new Limnadiadæ from Brazil and St. Domingo, was also read by Mr. Baird, at the meeting of the same Society on the 10th of February, 1853.

A monograph of the Entomostraca of the Cretaceous formation of England, by T. R. Jones, has appeared in the publications of the Palæontographical Society, 1851.

An excellent memoir by Dr. Fischer on new Russian species of Branchiopoda and Entomostraca, illustrated with 10 plates, 4to., has been published.

Dr. Fischer has also published a memoir on Russian species of Cypris, with plates.

A new genus of Entomostraca belonging to the Calanidæ, from the Atlantic Ocean, off Patagonia (Labidocera Darwinii), has been described by Mr. Lubbock (Ann. Nat. Hist. Jan. 1853), remarkable for the prehensile structure of the right antenna of the male.

A memoir by Van Beneden entitled 'Recherches sur quelques Crustacés inférieures,' of the coast of Belgium, was communicated to the Académie des Sciences on the 17th of November, 1851, and is published in the Ann. Sci. Nat. tom. xvi.

A memoir by Fr. Muller on the genera Caligus and Chalimus, appears in the Archiv. f. Naturg. 18 Heft. i. p. 91.

CIRRHIPEDIA.—Mr. Charles Darwin's classical monograph of the Cirrhipedes has been published by the Ray Society.

ARACHNIDA.

Some observations by M. Blanchard on the circulation of blood in the Arachnida, as observed in a living specimen of Mygale Blondii, were read at the Académie des Sciences on the 15th March 1852, and are given in the 'Comptes Rendus,' March 15, 1852, and in the Ann. Nat. Hist. August, 1852. M. E. Blanchard's series of plates of the anatomy of spiders and scorpions are noticed among the general anatomical works.

A curious series of experiments and observations on the effects of the poison of spiders on man, other insects, other spiders, and on inanimate substances, by Mr. Blackwall, is published in the 21st volume of the 'Transactions of the Linnean Society,' pt. 1.

The mortal poisonous effects of the sting of the scorpion of the North of Africa, both upon man and animals, have formed the subject of a series of observations by M. Guyon, addressed to the Académie des Sciences on the 13th of March, 1852.

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A note by Mr. G. Guyon, describing the curious action of a spider in cleaning its spinnerets with its hind-legs, is given in the 'Zoologist,' Jan. 1852.

A memoir on the sexual organs of spiders by W. J. Bennett, has appeared in the Proceedings of the American Assoc. Prom. Sci. iv. 106.

Mr. A. White exhibited drawings of the curious nests of two species of spiders, one from Albania, formed of the seed-vessels of Paliurus aculeatus arranged cylindrically, and the other from Pernambuco, (Proc. Ent. Soc. May, 1852).

Some anecdotes of spiders from the 'Bee,' by the poet Goldsmith, are reprinted in the 'Zoologist,' p. 3492.

Mr. Blackwall has continued his descriptive and synonymical list of British spiders in the 'Annals of Natural History' for 1852, reviewing the genera Neriene; Walckenaeria (Micryphantes, *Koch.*, Argus, *Walck.*), 20 species; Pachygnatha, *Sund.* (Manduculus, *Blckw.*) and Epeira, Tetragnatha, Dysdera, Segestria, Schænobates, *Bl.*, Oönops, Scytodes, and Savignia.

Mr. Blackwall has published descriptions of seven newly discovered species of spiders, chiefly from the neighbourhood of Interlacken in Switzerland, and different parts of England, (Ann. Nat. Hist. Aug. 1852).

A note upon Micrommata spongitarsis has been published by M. Léon Dufour in his 'Mélanges Entomologiques.'

Acaridæ.—M. Lucas has completed the description of a species of Ixodes, the male of which was found upon a Boa constrictor from Senegal (Ix. flavo-maculatus), by adding the description of the female, found on a Python Sebæ from the same country, (Ann. Soc. Ent. France, 1851, cxx.)

A posthumous memoir by M. Gene on a species of Sarcoptes (S. Strigis), which infests the cellular tissue and surface of the muscles of Strix flammea, has been published at Turin.

The destruction of French beans to a considerable extent, near London, by the attacks of a red-brown Acarus, which covers them with a delicate web, has been communicated to the Ent. Soc. Lond. by Mr. W. W. Saunders (Proceedings, Nov. 1851).

A treatise upon the parasitic species which causes the itch in man, has been published by Dr. Boursignon, Paris, 4to., with 10 coloured plates.

A few species of Acaridæ and Poduridæ are described by Mr. A. White in the appendix to the Journal of Dr. Sutherland's 'Voyage to Baffin's Bay.'

Thysanura.

Specimens of a minute Podura found on the ice in Wellington Channel, in the Arctic Regions, by Dr. Sutherland, were exhibited to us by Mr. A. White, (Proceedings, May, 1852).

Anoplura.

A memoir by W. J. Bennett on the relation of the distribution of lice to the different Faunas, has appeared in the Proceedings of the Amer. Assoc. for Prom. Sci. iv. 133.

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The 'Catalogue of the Collection of the Anoplura in the British Museum,' (recently enriched by the purchase of Mr. Denny's cabinet), has been published during the past year.

M. Lucas read a description of the Hæmatopinus parasitic upon the Bos Bubalus of Italy (H. tuberculatus, *Burm.*, H. Bubali, *Lucas, olim*), Ann. Soc. Ent. Fr. 1851, cx.

M. Lucas has described the singular mode of copulation of Philopterus Platalea, (Ann. Soc. Ent. France, 1852, xxxix).

———? The question as to the real nature of the Pediculus Melittæ of Kirby has been reopened by Mr. Smith, who has found specimens of it upon specimens of Anthophora Haworthana, which he had reared from their cells; thus showing that if deposited, as has been supposed to be the case, in the young active state in the cells of the bees, they must have remained all the year unchanged in size and shape, which could not have been the case had they been the young larvæ of Meloë or some allied genus, (Trans. Ent. Soc. Lond. n. s. ii. p. 4).

P.S.—I am happy in being able to announce that during the passage of these pages through the press, the Trustees of the British Museum have purchased Mr. Stephens's entire cabinets of British insects. By this most praiseworthy act, the typical specimens of the Marshamian and Stephensian, with many of the Haworthian, species, have been secured to the nation.

J. O. W.

March 16, 1853.

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Report of the Library and Cabinet Committee for 1852.

We beg to report that the collections of insects and the books of the Society have sustained no injury in their removal from Bond Street, and that they have been properly arranged in the two rooms appropriated to them.

The Curator has prepared a list of non-entomological books, which, not being used by any of the Members, and occupying space that may be more advantageously employed, we recommend may be disposed of by sale, or in exchange for entomological works.

It has not been deemed advisable to expend any portion of the grant for binding books, until the completion of the Catalogue on which Mr. Wilkinson has been engaged. This work has been delayed in consequence of his domestic calamities, but it will soon be finished, and then it will be necessary that some volumes should be bound.

The Committee appointed by the Council to consider and carry out the best method of arranging the exotic insects remaining in store-boxes, have employed the Curator to select in the first instance the duplicate specimens of the Coleoptera. Considerable advance is made in this work, and the insects are recommended to be offered in exchange to the members. Subsequently, the other orders will be proceeded with in the same manner.

The donations of British insects made to the Society during the year have been placed in cabinets. Many duplicates of British Lepidoptera still remain for distribution among the members, in exchange for other species, in accordance with our recommendation last year.

(Signed)

J. W. DOUGLAS.
S. J. WILKINSON.
EDWARD W. JANSON.

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Abstract of the Treasurer's Accounts for 1852.

RECEIPTS.

	£	s.	d.
By Balance in the hands of the Treasurer, January 1, 1852,	14	13	2
„ Arrears of Subscriptions,	10	10	0
„ Subscriptions for 1852,	94	10	0
„ Admission Fees,	12	12	0
„ One Composition,	10	10	0
„ Tea Subscriptions,	10	13	6
„ Sale of 'Transactions,'	24	11	11
„ Cash for extra copies of Plates, &c.	„	15	0
	£ 178	15	7

PAYMENTS.

			£	s.	d.
To paid arrears for 1851: — Mr. Westwood, for Plates,	£ 4	14 6			
Messrs. Roworth, for printing,	8	14 0			
Mr. Whitaker, for book,	1	9 0			
Mr. Newman, for printing,	2	15 0			
			17	12	6
„ Rent to Michaelmas, 1852, three quarters,			26	5	0
„ Insurance to Lady-day, 1853,			2	10	0
„ Curator,			18	4	0
„ Sundry small payments,			3	3	4
„ Tea, thirteen meetings,			13	0	0
„ Attendance, Coals, Oil, &c.			6	17	8
„ Altering Cabinet, Postage, Parcels, Stationery, &c.			5	15	4
„ Purchasing Books,			1	2	6
„ Printing 'Transactions,' Vol. I. part 8, n. s.	£ 15	11 0			
„ „ „ Vol. II. part 1, n. s.	8	14 6			
„ „ „ „ 2,	8	12 0			
			32	17	6
„ „ Proceeedings, President's Address, &c.			20	16	0
„ Engraving Plates,			3	3	6
„ Colouring ditto,			8	19	11
„ Printing ditto,			9	19	0
Balance in hand,			8	9	4
			£ 178	15	7

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Liabilities and Assets of the Society.

Liabilities.	£	*s.*	*d.*
Mr. Yates, printing plates, ...	1	5	0
Mr. Standish for moving, ...	10	15	0
Mr. Webb, colouring plates,	6	18	6½
Messrs. Roworth, for printing 'Transactions,'	9	8	6
Mr. Newman, ditto 'Proceedings,'	4	4	6
Messrs. Day, printing plates,	2	10	0
Messrs. Ford and West, ditto,	3	7	6
1 quarter's Rent to Christmas and attendance, ...	9	8	2
Mr. Westwood, zincographing plates, ...	6	6	0
	£ 54	3	2½

Assets.		£	*s.*	*d.*
Arrears of Subscription, good,		8	8	0
„ „ doubtful,		16	16	0
„ „ bad,		12	12	0
Balance in hand, ...		8	9	4
		46	5	4
Less Arrears of Subscriptions, bad, ...£	12 12 0			
doubtful, ...	7 10 0			
		20	2	0
		26	3	4
Deficiency, ...		27	19	10½
		£ 54	3	2½

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PROCEEDINGS

OF THE

ENTOMOLOGICAL SOCIETY OF LONDON.

1853.

February 7, 1853.

EDWARD NEWMAN, Esq., President, in the chair.

The President returned thanks for his election, and nominated as Vice-Presidents, W. W. Saunders, Esq., W. Spence, Esq., and J. O. Westwood, Esq.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for February; by the Editor. The 'Literary Gazette' for January; by the Editor. 'Journal of the Society of Arts,' Nos. 1—10; by the Society. 'Entomologische Zeitung' for December, 1852; 'Linnæa Entomologica,' 7 Band: Berlin, 1852; 'Catalogus Coleopterorum Europæ, herausgegeben vom Entomologischen Verein in Stettin:' Vierte Auflage, Berlin, 1852; all by the Entomological Society of Stettin. 'Bericht über die wissenchaftlichen Liestungen im Gebiete der Entomologie während des Jahres, 1850,' von Dr. Herm. Schaum, Berlin, 1852; by the Author. 'Description of a New Genus of Calanidæ,' by John Lubbock, Esq.; by the Author. 'Memorias de la Academia Real de Ciencias de Madrid,' Tomo I. parti 2: Madrid, 1851; 'Resumen de las Actas,' 1850—51: Madrid, 1851; by the Academy. 'Journal of the Royal Agricultural Society of England,' Vol. XIII. part 2; by the Society. 'Reports of the Juries of the Exhibition of 1851;' by the Commissioners of the Exhibition. A specimen of Glossina morsitans; by Mr. Spence. A specimen of the insect-wax of China; by Mr. D. Hanbury. Specimens of Asemum striatum (3), Pissodes Pini (4), Tinea ochraceella, *Tengstrom* (3), Elachista locupletella (2); by Mr. John Scott, Renfrew.

The following gentlemen were balloted for and elected: John Garland, Esq., Dorchester, a Member, and F. T. Hudson, Esq., Greenwich, a Subscriber to the Society.

Mr. D. Hanbury brought for exhibition, specimens of the white insect-wax of China in its crude state, obtained by the persevering endeavours of his friend, William Lockhart, Esq., of Shanghae. The correct Chinese name for this production is *Chung-pih-la*—literally, insect-white-wax. He read the following particulars respecting it, and the insect by which it is produced, from a paper by Dr. Macgowan in the 'Journal of the Horticultural and Agricultural Society of India,' 1850.

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"The animal feeds on an evergreen shrub or tree, Ligustrum lucidum, which is found throughout Central China, from the Pacific to Thibet, but the insect chiefly abounds in the province of Sychuen. Much attention is paid to the cultivation of this tree: extensive districts of country are covered with it, and it forms an important branch of agricultural industry. The ground is ploughed semi-annually, and kept perfectly free from weeds. In the third or fourth year the trees are stocked with the insect, which is effected in spring, with the nests of the insect. These are about the size of a 'fowl's head;' and are removed by cutting off a portion of the branch to which they are attached, leaving an inch each side of the nest. The sticks with the adhering nests are soaked in unhusked-rice-water for a quarter of an hour, when they may be separated. When the weather is damp or cool, they may be preserved in jars for a week, but if warm, they are to be tied to the branches of the trees to be stocked without delay, being first folded between leaves. By some the nests are probed out of their seat in the bark of the tree, without removing the branches. At this period they are particularly exposed to the attacks of birds, and require watching.

"In a few days after being tied to the tree, the nests swell, and innumerable white insects, the size of 'nits,' emerge, and spread themselves on the branches of the tree, but soon, with one accord, descend towards the ground, where, if they find any grass, they take up their quarters. To prevent this, the ground beneath is kept quite bare, care being taken also that their implacable enemies, the ants, have no access to the tree. Finding no congenial resting place below, they reascend and fix themselves to the lower surface of the leaves, where they remain several days, when they repair to the branches, perforating the bark to feed on the fluid within.

"From 'nits' they attain the size of Pediculus homi. Having compared it to this, the most familiar to them of all insects, the Chinese authors, from whose writings most of these particulars have been derived, deem all further description superfluous. Early in June, the insects give to the trees the appearance of being covered with hoar frost, being 'changed into wax:' soon after this they are scraped off, being previously sprinkled with water. If the gathering be deferred till August, they adhere too firmly to be easily removed. Those which are suffered to remain to stock trees the ensuing season, secrete a purplish envelope about the end of August, which at first is no larger than a grain of rice, but as incubation proceeds, it expands, and becomes as large as a fowl's head, which is in the spring, when the nests are transferred to other trees, as already described.

"On being scraped from the trees the crude material is freed from its impurities, probably the skeleton of the insect, by spreading it on a strainer covering a cylindrical vessel, which is placed in a cauldron of boiling water; the wax is received into the former vessel, and on congealing is ready for the market.

"This white wax, in its chemical properties, is analogous to purified bees'-wax, and also spermaceti, but differing from both; being, in my opinion, an article perfectly *sui generis*. It is perfectly white, translucent, shining, not unctuous to the touch, inodorous, insipid, crumbles into a dry, inadhesive powder between the teeth, with a fibrous texture, resembling fibrous felspar; melts at 100° Fahr. (*sic*); insoluble in water, dissolves in essential oil, and is scarcely affected by boiling alcohol, the acids or alkalies.

"The aid of analytical chemistry is needed for the proper elucidation of this most beautiful material. It has been supposed to be identical with the white wax of

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Madras, but as the Indian article has been found useless in the manufacture of candles, it cannot be the same as the Chinese, which is used for this purpose. It far excels also the vegetable wax of the United States (*Myrica cerifera*).

"Is this substance a secretion? There are Chinese who regard it as such; some representing it to be the saliva, and others the excrement of the insect. European writers take nearly the same view; but the best authorities expressly say that this opinion is incorrect, and that the animal is changed into wax. I am inclined to believe that the insect undergoes what may be styled a ceraceous degeneration, its whole body being permeated by the peculiar product, in the same manner as the Coccus Cacti is by carmine.*

"It costs at Ningpo, from twenty-two to thirty-five cents per pound. The annual products of this humble creature in China, cannot be far from 400,000 lbs."

Mr. Hanbury added, that it was harder than bees'-wax and that its fusing point was about 184° Fahr.; it had been imported into this country and employed for making candles and other purposes, but it was too expensive to be generally useful.

Mr. Westwood remarked that the insects were the wingless females of a species of Coccus, which, with the exception of their short legs, were wholly permeated with the secretion of wax. He proposes to call the species C. Sinensis.

Mr. Westwood exhibited the following species of Coccidæ, all more or less resembling the insect under notice, in producing colouring or waxy matter. Coccus Ilicis, from the South of Europe; Margarodes Formicarum, the ground pearl of the West Indies; Coccus manniparus, from Mount Sinai; and a species from Manilla.

Mr. Hanbury also exhibited a Chinese print of the tree, the insects, and the masses left on the plants from which the Cocci are propagated.

Mr. Douglas read part of a communication made to the 'Gardeners' Chronicle' a short time since, by Mr. Fortune, on the insect in question.

"Sir George Staunton observed an insect of this description on the coast of Cochin China, 'busily employed upon the small branches of a shrub then neither in fruit nor flower, but its general habit bearing somewhat the appearance of a privet;' writers generally call this plant Ligustrum lucidum; yet M. S. Julien who has intimate knowledge of the written language of China, says, that the wax insects are stated to be raised on three species of plants, namely, Ligustrum glabrum, Rhus succedanea, and a species of Hibiscus, (Comptes Rendus, 1840). But I now possess evidence which goes a long way to prove that another plant, different from any of the above, is the true white-wax tree of Central China. Before leaving China I had the honour of receiving from the French Consul at Shanghae, two small trees, which had been brought down by one of the Catholic missionaries from the province of Sychuen. I cannot see how any mistake could have been made, as the tree is no doubt as common in that province, as the tallow-tree is at Che Kiang. I am happy to say that one of these plants has reached this country in good condition, and is now at the Exotic Nursery of Messrs. Knight and Perry at Chelsea. It appears very like an ash, but

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* "In a memoir in the 'Philosophical Transactions' for 1848, Mr. B. C. Brodie states, that although in appearance this substance resembles stearine or spermaceti more than bees'-wax, it comes nearest to purified *Cerin!*"

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apparently different from any known species. It is deciduous, and no doubt will prove perfectly hardy in the gardens of this country."

Mr. Baly exhibited some bees which had been preserved in spirit, and restored to their pristine beauty by washing with soap and warm water, the pile being dried and raised with blotting paper.

Mr. Waterhouse said he had often treated insects of all orders, except Lepidoptera, in this way, even when they were greasy, with the greatest success, and Mr. Edward Sheppard also spoke in its favour.

The following communication from Mr. Spence was read: —

"Through the kindness of Dr. Quain, of Harley Street, Cavendish Square, I am enabled to lay before the Society specimens of the African Dipterous insect, '*Tsétsé*,' communicated to him by William Oswell, Esq., who has travelled extensively in Africa; and also the following very interesting memorandum respecting it, by the same gentleman, who informed him that on one occasion he lost forty-nine out of fifty-seven oxen, of which his teams consisted, from the attacks of this insect, and that the interval from their being first attacked to their death, varied from three to twelve weeks.

"'*Tsétsé*.—This fly, which is the same as that found to the eastward of the Limpopo, infests the country of Sebitoeni, a chief living between the 18th and 15th degrees of South latitude, and the 24th and 28th of East longitude. It is fortunately confined to particular spots, and is never known to shift. The inhabitants herd their cattle at a safe distance from its haunts; and should they, in changing their cattle-posts, be obliged to pass through tracts of country in which it exists, they choose a moonlight winter's night, as during the nights of the cold weather it does not bite. From what I have seen, I believe that three or four flies will kill a full-grown ox. We examined about twenty of ours which were bitten and died, and the appearances were similar in all. On raising the skin, a glairy appearance of the muscles and flesh (which was much wasted) presented itself. The stomach and intestines healthy; the heart, lungs and liver, sometimes all, and invariably one or the other, diseased; the heart in particular attracted our attention, it was no longer a firm muscle, but collapsed readily on compression of its walls, and had the appearance of flesh that had been steeped in water. The blood was greatly diminished in quantity and altered in quality; not more than twenty pints could be obtained from the largest ox, and that thick and albuminous; the hands, when plunged into it, came out free of stain. The poison would seem to grow in the blood, and through it to affect the vital organs. All domesticated animals, save, I believe, goats, die from the bite of this insect. Calves and sucking animals however are not affected; and man and all wild animals are bitten with impunity. The symptoms of the bite are swelling of the eyelids and a watery discharge from the eyes, and considerable enlargement of the sublingual glands.'

"Mr. Oswell's interesting account gives several new and curious particulars relative to the effect of the bite of this insect on the animals attacked by it, not mentioned in Mr. Cumming's 'Five Years of a Hunter's Life in the far Interior of South Africa,' nor in the valuable paper by Mr. Westwood read to the Zoological Society, December 10, 1850,* on this species, where it is described as belonging to the genus Glossina of Wiedemann (allied to Stomoxys, but differing in having the proboscis straight, with-

* 'Proceedings,' in the 'Annals of Natural History,' x. 138—150.

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out any elbow, and with a round, hairy, bulbous base, possibly, as suggested to Mr. Westwood by Professor Owen, a reservoir of some powerfully poisonous liquid), under the name of Glossina morsitans, *Westwood*.

"The specimens now laid before the Society, agree exactly with Mr. Westwood's description."

Mr. Oswell, who was present as a visitor, gave a detailed and very interesting account of his experience with this African pest, the facts of which are embodied in the foregoing communication. He mentioned however that the fly makes a droning hum, and is so pertinacious in its attacks that it is impossible to drive it away.

Mr. Spence also called attention to the discovery in the caves of Illyria, of two more species of blind beetles, a printed account of which, by Herr Schmidt, had been sent to him by the author, extracted from the 'Laibacher Zeitung,' August 4, 1852. These insects were both found in the darkest parts of the caves, and retreated quickly from the light into clefts of the rock.

"Leptoderus angustatus. Red-brown; head and thorax darker, shining, the latter swelled out in front, and hindwardly much contracted; elytra oval, viewed with a lens they are scarred and marked with fine points: palpi, antennæ and feet somewhat lighter brown, beset with strong, yellowish hairs. The female has in the tarsi of the fore-feet only four joints, but five in all the others; whereas the male has five joints in the fore-feet also, of which the first, second, and third, are enlarged from the base outwards, especially the first, which exceeds the next two both in length and width.

"Leptoderus sericeus. Brown; head and thorax slightly darker, face with fine yellow hairs; thorax nearly even with the head, cylindric, long, broad, and widened a little in front: palpi and antennæ much lighter, the latter, particularly in the male, very long-jointed, and from the sixth joint with yellow hairs; the tarsi in the male are five-jointed as in the preceding species, but the joints are of equal thickness. The body is 2 lines long, and scarcely 1 line broad, and is of the form of L. angustatus. The elytra are marked with fine, round depressions, and covered with shining yellow hairs. Both sexes are much alike in colour, but in the female the joints of the antennæ are rather shorter, and the joints of the fore-tarsi are only four."

Mr. Spence remarked, that though these beetles lived in the darkest caves, and were described to be eyeless (augenlos) yet their running away from light seemed to show they were not destitute of an optic nerve.

Read, the following extracts of a letter addressed to the Secretary by the Rev. Joseph Greene of Halton Rectory, near Wendover, dated December 8, 1852.

"In reference to the question of 'whether the earth in caterpillar-boxes should be moist or dry?' there are two points in favour of the latter, which I omitted to mention last night. Should the earth be in any degree of a clayey consistency, the moistening tends to make it so close, as to render it nearly impossible for the weaker larvæ to penetrate it, as I have found to be the case more than once. Again, if the earth be moistened, it often happens, that after drying, it becomes so hard as to prevent the pupa from bursting, and permitting the escape of the insect. I have repeatedly found this to be the case in digging for pupæ. And once I found even so large and strong an

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insect as Smerinthus Tiliæ, which from this cause had been unable to escape. It was perfectly formed; but was so firmly imbedded that it could not emerge, and miserably perished! This I imagine to be one of the causes of the periodic uncertainty in the appearance of many insects. I feel no doubt, that, when hard frosts succeed protracted rains, a multitude of subterranean pupæ are thus destroyed.

"You observed that Ireland had been much neglected by entomologists. I am quite of your opinion. I am sure there are many valuable insects to be found there. In proof of which, I may mention that Mr. Ball himself took five specimens of Deilephila Euphorbiæ, somewhere on the southern coast. I do not at this moment remember the exact locality, but could easily find out. I saw two of the specimens; the others perished though neglect. I have in my own collection, two Euphorbiæ and one Galii, taken in Ireland; and, as I mentioned to you, I am certain I saw Catocala Fraxini."

Mr. Waterhouse observed, that the Rev. F. W. Hope used to rear great numbers of Lepidoptera, and he always kept the earth in his cages covered with damp moss.

Read also, the following note by the Rev. J. Greene, on a curious circumstance observed in hybernating specimens of Vanessa Io.

"About ten days since (December 8), being engaged in digging for pupæ, in a wood about a mile from my residence, I came to a moderate-sized beech-tree, whose roots formed an arch, about half a foot in height. As I was on the point of inserting my trowel into the cavity, I heard a faint hissing noise: thinking it might be an adder, I started back. Upon a closer inspection, however, I discovered, to my great surprise, three hybernating Vanessa Io (the peacock). Two were attached to the concave part of the arch, the third was on the ground, and the noise I heard proceeded from it. It is difficult to describe the noise exactly, but the nearest approximation to it, is the sound produced by blowing slowly, and with moderate force, through the closed teeth. It was decidedly not a rustling sound, such as would proceed from an imprisoned insect. While making the noise, the wings were slowly depressed and elevated. To remove any doubt as to whether the sound was produced by the insect, I pushed off one that was adhering to the tree, which immediately commenced the same movement of the wings, accompanied by a similar noise. That the noise was produced in part by the movement of the wings is very likely; but that it was wholly so, is, I think, improbable, from the fact of the extreme slowness (I might say, deliberation) with which the wings were opened and shut. Strange as it may appear, it certainly struck me that the noise was intended to intimidate! Whenever I pointed the trowel at it, it forthwith turned towards it, and commenced the noise with renewed vigour. I saw no more, neither do I remember to have ever met with hybernating Diurnes before.

"As I think I can find the tree again, I shall re-examine it, though I am not aware that I can add anything to the above.

"I may add, that a more unlikely place for hybernation could scarcely be found. The tree was on a high bank, facing the north, and the opening was quite exposed to rain, snow, &c."

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The following memoirs were also read:—

"Descriptions of some new species of Longicorn beetles, brought from the North of China, by R. Fortune, Esq." By W. W. Saunders, Esq.

"Descriptions of new Genera and Species of Curculionidæ," by G. R. Waterhouse, Esq. The following is an abstract:—

Oxyrhynchus.—Family *Oxyrhynchidæ*.

Oxyrhynchus Fortuni. A species much larger and proportionately shorter than *O. discors*, with the puncturing both on the thorax and elytra less distinct; general colour pale ashy brown; thorax with three longitudinal white lines; elytra with a white line running from the shoulder to the middle of the suture. Hab. N. China.

Oxyrhynchus Philippininensis. Like *O. discors* in its markings, but of larger size, the elytra relatively shorter, with a tooth in the middle at the base, the margin much raised between this tooth and the scutellum, and the raised part concave beneath and opening in front. Hab. Philippine Islands.

Tetralophus, a new genus of the *Etimidæ*, which appears to approach most nearly to the genus *Mythites* of Schönherr, but, judging from the description, must have the antennæ shorter, and differs, moreover, in having two longitudinal crests on the rostrum, the sides of the thorax much produced and angular, and the upper surface with two high crests; the legs very slender.

T. sculpturatus is 5¾ lines long; black, and has two series of angular tubercles on each elytron, the hindermost tubercle being the largest in the inner series, and the foremost and last tubercles of the outer series are both very large. Hab. Swan River.

Leptostethus, a new genus of *Pachyrhynchidæ*, near *Polyphrades* in its characters, but with the body much more elongated, and the anterior coxæ separated, leaving a narrow chest between them.

L. marginatus, a large insect, being 7¾ lines long,* and 2⅜ wide; much elongated, the rostrum very broad and flat above, the sides of the body nearly parallel: black; thorax thickly covered with small glossy granules; elytra crenato-striated: both thorax and elytra with a broad, yellow, squamose band at the sides; femora red, with the apex black.

L. Waltoni is black, covered with pale, dirty yellowish scales; has the femora red, the rostrum with four keels; thorax thickly granulated; elytra punctato-striate, the apex somewhat produced at the suture; length 5 lines; breadth 2 lines. Both species are from South-West Africa.

Achlainomus, new genus of the *Pachyrhynchidæ*. General form most near to *Prostomus*, the rostrum wants the longitudinal ridges seen in that genus; the jaws are short, the joints of the antennæ rather shorter, the thorax less convex; the elytra shorter and less convex, separated from the prothorax, and with the humeral angles not produced: fore tibiæ much curved and very strongly dentated within; middle and hind tibiæ dilated and produced externally and internally at the apex.

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* The rostrum is not included in the dimensions of length given in the paper.

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A. ebeninus is from India: glossy black, destitute of scales; antennæ, and terminal joint of tarsi pitchy red; rostrum canaliculated; thorax very delicately punctured, canaliculated; elytra punctato-striated. Its length is 4½ lines; width 1¾ line.

ENAPTORHINUS, a new genus of the *Brachyderidæ*, nearly related to *Geotragus*, but differs in the form being much more elongated, the rostrum somewhat convex above, separated from the head by a transverse depression, the antennæ stouter and with shorter joints. The male has the hinder tibiæ clothed with very long pale hairs.

E. Sinensis is 4⅝ lines long, and 1½ line broad, of a pitchy brown colour, sparingly clothed with scales; thorax rugose, and with three pale lines: elytra punctato-striate; the back much depressed, and even slightly concave in the middle, but somewhat humped near the apex, where there are numerous long hairs. Hab. N. China.

CUBICOSOMUS, a new genus of the *Cleonidæ*, near *Leptops*, but with the elytra very short and nearly of a cubical form; the two basal joints of the funiculus only are obconic, the rest very short; the rostrum rather longer than in *Leptops*.

C. Whitei is 5½ lines in length, and 3½ in width; black, with brownish scales; rostrum with a longitudinal depression, the base obtusely carinated, the forehead with a slight swelling on either side; thorax narrow, the sides nearly straight, above very uneven, rugose, the middle longitudinally impressed, and with an irregular transverse depression behind the middle; elytra above uneven, deeply punctured, the punctures arranged in somewhat irregular rows, the second and fifth (or sixth?) insterstices each with four large obtuse tubercles, and the apex with some smaller tubercles. Hab. Richmond River, New Holland.

EURYCHIRUS, a new genus of the *Molytidæ*, near *Hypera*. Rostrum and antennæ nearly as in *Hypera punctata*; the head rather more exserted; the thorax without any trace of post-ocular lobes: the legs very long and very stout, the femora much incrassated in the middle; the tarsi very large, and unusually broad.

E. bituberculatus. Length 4½ lines; width 2¾ lines. Form short and broad; elytra with the humeral angles produced, obtusely angled: black, clothed with greenish gray, sub-metallic scales; rostrum pitchy, carinated; thorax thickly punctured; elytra punctato-striated, the punctures each enclosing a scale; each elytron with a large tubercle nearly in the middle, and a smaller one, sub-apical in its position. Hab. New Holland.

PLACODERES, a new genus of the *Cyclomidæ*, nearly related to *Acantholophus*, but differs in having the funiculus of the antennæ distinctly seven-jointed, the head and thorax destitute of spines, the latter very broad, much produced at the sides, and nearly angular in the middle, the dorsal surface nearly flat: elytra pedunculated, not touching the prothorax.

P. variegatus. Length 9 lines; width 3¾ lines. Black, clothed with minute, narrow scales, some brown and some yellowish; rostrum tricarinated; thorax thickly granulated, and slightly grooved along the middle; elytra punctato-striated, the punctures remote, interstices with small glossy granules, variegated with dirty yellow, brown and black. Hab. unknown, probably Australia.

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Ectemnorhinus, a new genus of the *Phyllobidæ*, near *Phyllobius*; the general form more elongated and less convex; rostrum shorter; the antennæ inserted in a cavity near the apex, which cavity has the fore part opening laterally, the hinder part curved inward, and opening on the upper surface of the rostrum: elytra much elongated, and each elytron obtusely rounded at the apex: body soft.

E. viridis. Length 3¾ lines; width 1¼ line. Elongate, pitchy, clothed with metallic green scales; legs and antennæ ferruginous; thorax small, sub-cylindrical, but slightly swollen in the middle, and rather obscurely keeled; elytra delicately punctato-striated. Hab. Kerguelen's Land, in the Southern Ocean.

Drepanoderes, a new genus, also of the *Phyllobidæ*, remarkable for the thorax being produced on either side into a large sub-recurved pointed process, the apex of the process extending beyond the humeral angle of the elytra.

D. viridifasciatus (an insect in the collection of the British Museum), is 2¾ lines long; black; antennæ and legs red, clothed with bright green metallic scales; head with a triangular black patch behind; thorax punctated, with three longitudinal denuded bands; elytra punctato-striated, each with four irregular, short, transverse, green bands, which extend neither to the suture nor the outer margin, and with a few irregular green patches near the apex.

D. fuscus, is a trifle smaller than the last, and of a brown colour; the legs and antennæ testaceous; the interstices of the striæ of the elytra clothed with small hairs. Both species are from India.

Synaptonyx, a new genus of the *Erirhinidæ*. Body of a short ovate form, the thorax very little narrower than the elytra, which are emarginated in front in the form of a segment of a circle; rostrum about equal to the head and thorax in length, and of moderate thickness, rather suddenly bent down near the middle; the antennal groove scarcely visible excepting in front, where the antennæ are inserted; antennæ moderate. Legs rather short, claws united at the base, and very little separated at the apex.

S. ovatus, black, clothed with small ashy white scales; antennæ and terminal joint of the tarsus ferruginous; rostrum clothed with scales above, carinated at the base, the apical portion acutely margined on either side, and the upper surface nearly flat; thorax very finely punctured and with but few scales; elytra striato-punctated, the interstices broad, and having the scales in small patches, giving a variegated black and pale appearance. Hab. Australia.

Chelotonyx, a new genus of the *Erirhinidæ*, nearly allied to *Prionomerus*, but differs in having the body of a somewhat longer and more ovate form, the rostrum and antennæ longer; the tarsi also longer, and furnished with bifid claws. The claws in *Prionomerus*, it may be remarked, have a large square appendage at the base. The fore-femora have the same large serrated tooth beneath, and the anterior tibiæ are curved as in *Prionomerus*.

C. Batesii is about equal in size to *Balaninus nucum*, of a bronze colour, and clothed with piliform, whitish scales, those on the elytra forming little patches: rostrum tricarinated above; thorax punctured; elytra punctato-striated. Length 3½ lines. Hab. Pará, Amazons.

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Anomæarthria, a new genus of the *Baridiidæ*, near *Cylindrocerus*. The female of the species on which the new genus is founded, differs from *Cylindrocerus* in having all the joints of the funiculus of the antennæ obconic, and the rostrum very strongly curved, so that the point is directed backwards; and the male is distinguished from all other *Baridiidæ* in having the funiculus composed, first, of a very small joint, then a very large oval joint, and with the following joints all nearly oval but decreasing successively in size. The middle tibiæ at the apex, the posterior tibiæ on the inner side, and the basal joint of the four posterior tarsi are each furnished with a tuft of velvet-like yellow hairs.

A. cæruleipennis is nearly equal in size to *Cylindrocerus signum*, but of a narrower form; glossy black, with the elytra purple-blue, a small spot of yellow scales at the base of each elytron, not far from the scutellum: male, with the joints of the funiculus clothed with long hairs, and the body with scattered yellow scales beneath. Length 3 lines. Hab. Minas Geraes, Brazil.

Protopalus, Schönherr (*Cryptorhynchidæ*). Mr. Waterhouse expresses an opinion that the characters of this genus are drawn up from a male insect only, and that the female does not present the crenulations on the under side of the rostrum, and that it differs further from the male, in having the anterior legs very little longer than the others. This opinion is founded upon the fact that he possesses an insect presenting these differences (and these only), when compared with Schönherr's description of *P. Stephensi*. A second species is described, which differs from the insect referred to in Mr. Waterhouse's collection, in having the thorax and elytra rather less humped, and in having the second joint of the funiculus fully twice as long as the first. Its length 7½ lines. Hab. Moreton Bay. It is named *P. Schönherri*.

Pezichus, a new genus of the *Cryptorhynchidæ*—first division: founded upon an insect in which the structure of the antennæ resembles that in *Cylindrocorynus*, excepting that these organs are rather longer and more slender. The legs are very long and slender, the femora not clavate; the tarsi very long and slender and with the first joint nearly as long as the remaining three taken together; thorax rather small; elytra moderate as to length, nearly twice as broad as the thorax.

P. binotatus is 5¾ lines in length, and 2½ in breadth. Black, unequally clothed with brown scales; thorax granulated behind and at the sides, and keeled above; elytra punctato-striated, the punctures very widely separated, and each enclosing a scale; the second interstice keeled; a small, oblique, dirty white mark on each elytron, rather behind the middle: femora dentate. Hab. Moreton Bay.

Glochinorhinus, a new genus of the *Cryptorhynchidæ*—first division: body nearly cylindrical, tubercular and squamose; funiculus with the terminal joint more slender than the rest, and longer than several of the preceding joints. Male with a recurved spine on each side of the rostrum in the middle, and a small spine behind this.

G. Doubledayi (Protopalus? Doubledayi, *Jeckel's MSS.*): black, clothed with cinereous scales; thorax granulated, and with a middle keel; elytra irregularly punctato-striate; the second interstice with three short crests, each appearing as if composed of an aggregation of tubercles; third interstice with one tubercle in the middle, fourth with several small tubercles, and with a sub-apical group of four or five small

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tubercles; legs long and slender; fore-legs the longest. Length 5½ lines; width 2⅓ lines. Hab. Moreton Bay.

PROTOPTERUS, Schö. Four new species of this genus are described, and these are placed in two sections.

Section I.—The second joint of the funiculus much longer than the first. It includes—

P. Chevrolatii, which is of an elongate-ovate form, has the thorax attenuated and two-pointed in front, and produced considerably beyond the head, with a short keel in the middle of the dorsal surface, and an obtuse tubercle on each side of this keel: small granules are scattered over the surface of the thorax and elytra; the latter are irregularly punctured, excepting at the sides, and each elytron has about nine obtuse tubercles, three in the second interstice, three in the fourth, one in the sixth, and two near the shoulder: the apex is produced into two conical tubercles, one belonging to each elytron. General colour black, clothed with brown scales; a band of greenish ash-coloured scales runs from the shoulders obliquely inwards and backwards, beyond the middle of the elytra. Length 6½ lines; width 2½ lines. Hab. Moreton Bay.

P. Jeckelii is rather broader, and less convex than the preceding, has the thorax produced beyond the head, and bilobed in front; the dorsal surface keeled and bituberculate, the sides rounded and notched in the middle; a few very minute granules scattered on the elytra: each elytron with three large obtuse tubercles on the place of the second interstice, two on the fourth, one on the sixth in the middle, and two at the shoulder, besides a transverse irregular elevation at the base; the apex produced into a large tubercle, having a triangular base. Black with minute brown scales, and scattered large scales. Length 6⅔ lines; width 2⅔ lines. Hab. Moreton Bay.

Section II.—Antennæ with the two basal joints equal, or very nearly so.

P. Parryi nearly resembles *P. Jeckelii*, but the tubercles on the elytra are less obtuse, and some of them pointed; humeral angles of the elytra more prominent; the thorax with two tubercles in front, and not produced beyond the head; a very obtuse keel in the middle, and two tubercles (one behind the other) on each side of the keel, besides a lateral tubercle; elytra each with a sub-apical, dirty white mark, united posteriorly to a small tubercle of the same colour, the scales on other parts brown. Length 7½ lines; width 3¼ lines. Hab. Sydney. In the collection of the British Museum.

P. Westwoodii, more elongate and more convex than the two preceding species; thorax produced slightly beyond the head in front, where there are two obtuse tubercles; the central portion with a short keel; and four tubercles are arranged nearly in a transverse line on the middle of the thorax, the outer pair project horizontally from the sides of the thorax, which, together with the upper surface of the elytra, presents numerous small glossy granules scattered over the surface. Each elytron has five conical tubercles arranged in a line parallel with, and not far from the suture, of which the fourth is very large and prominent, the last (or fifth) small; besides these are a few other tubercles, of which three may be especially noticed; they are arranged in an oblique line, extending from the shoulder to the third of the inner row of tubercles; apex of the elytra truncate. Length 7½ lines; width 2¾ lines. Hab. Australia.

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Plagiocorynus, a new genus of the *Cryptorhynchidæ*—first division: founded upon a large Cryptorhynchus, with a general form of the body somewhat like that of *Leptops quadrituberculatus*. Rostrum very short and stout, and irregularly quadricarinated above; thorax large, produced in front into a rounded lobe which projects considerably beyond the head; elytra of the same width at the base as the thorax, gradually becoming wider towards the hinder part, the sides very deep and bent somewhat inwards, the apical portion bent suddenly downwards, with four obtuse tubercles in a transverse line, behind the middle; the base rather deeply trisinuated; legs short and stout, femora not dentate; tarsi small; antennæ with the second joint of funiculus elongate obconic, the first short obconic, the rest very short; club short, and obliquely truncated, the three terminal joints for the most part hidden and enclosed by the basal joint.

P. quadrituberculatus is black, clothed with dark brown scales; thorax rather coarsely punctured, with a mesial keel and a short keel on each side of the disc; elytra with large punctures arranged in rows. Length 6 lines; width 3 lines. Hab. Moreton Bay. The male smaller and narrower than indicated by the dimensions here given.

Chætectetorus, Schönherr.

C. spinipennis, a new species. Length 4 lines; width 1¾ line. Black, clothed with brownish scales: thorax with a short mesial keel, and two longitudinal and slightly elevated crests on the fore part, diverging slightly as they extend backwards towards the middle of the thorax; elytra punctate-striated, with a transverse black band behind the middle, and which does not extend to the outer margins; an oblong black spot between this and the base, a small tubercle towards the apex, clothed with pale brown scales, and minute black markings; apex produced at the suture into a sharp spine, and some acute denticles external to this spine. Hab. Australia.

Sympiezocelus, a new genus of the *Cryptorhynchidæ*—first division: founded upon an insect which in general form reminds one of the species of *Tranes* or *Iphipus*.

S. Spencei is of a glossy, pitchy-black colour, destitute of scales: rostrum short, rather slender and depressed, dilated at the base; antennal groove in form of an oblong fovea, situated immediately in front of the eye; antennæ with the basal joint (or scape) very short and almost obconic; first and second joints of funiculus obconic, the rest short; club of a very short oval form, almost round: thorax emarginated on each side behind the eye, constricted in front, the sides very little rounded, upper surface but little convex, with scattered punctures, and a very short keel behind: elytra very little broader than the thorax, oblong, rounded at the apex, strongly punctato-striated: legs short, femora large and compressed; tibiæ broad and compressed, dentated externally near the apex, and with a large incurved claw at the apex; tarsi small, not dilated: the two basal joints destitute of spongy substance beneath. Hab. Richmond River, Australia.

Hybophorus, a new genus of the *Cryptorhynchidæ*—second division: the rostral groove not acutely margined behind: founded upon an insect having the general form nearly similar to certain species of *Centrinus*, such as *C. morio*: the thorax short, narrow before, and broad behind; the elytra much broader than the thorax at the base,

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with the shoulders prominent, but rounded, the width gradually decreasing to the apex, which is rounded; nearest to *Rhyssomatus* in affinity, but differs in having simple diverging claws (those in *Rhyssomatus* being bifid), and in having the humeral angles of the elytra prominent: rostrum long, sub-carinated; antennæ with two basal joints of funiculus longish obconic, the rest short; eyes large, much approximated in front: thorax constricted in front, then dilated with a rounded outline, with a much elevated keel on the fore part.

Hybophorus rufo-tuberosus; black; without scales; thorax with a transverse row of large punctures in front, interrupted by the large central keel, and some coarse punctures on either side; elytra with the region of the suture smooth, and in the place of the first stria, with widely separated depressions, each bearing in the centre a small glossy black granule, the remaining parts very uneven, with irregular and obtuse tubercles, the crowns of which are red, the interspaces having scattered black granules; of the tubercles one at the shoulder is very large, and the same may be said of a second, which is placed about midway between the base and apex of the elytra, and not far from the suture; femora with a strong tooth beneath, rather beyond the middle, and a smaller tooth between this and the apex. Length 3¾ lines; width 2¼ lines. Hab. Australia. Probably Moreton Bay.

March 7, 1853.

Edward Newman, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors: — The 'Zoologist' for March; by the Editor. The 'Athenæum' for February; by the Editor. The 'Literary Gazette' for February; by the Editor. The 'Journal of the Society of Arts;' by the Society. 'Insecta Saundersiana.—Diptera, Part IV.;' by W. W. Saunders, Esq. 'Entomologische Zeitung' for November, 1852, and January, 1853; by the Entomological Society of Stettin. 'Annales de la Société Entomologique de France,' 1851; by the Society. 'Proceedings of the Royal Society,' Vol. vi., No. 94; by the Society. Boxes of English Lepidoptera from the following gentlemen:—Mr. F. Bond, Major Sheppard, Mr. A. F. Sheppard, Mr. Edwin Shepherd, and Mr. T. Boyd. A box of English Micro-Lepidoptera; by Mr. Douglas. Two boxes of European Lepidoptera; by M. Becker, of Paris. One hundred lists of British Lepidoptera; by Mr. J. W. Dunning.

These lists were presented for the special purpose of benefiting the Society's collection of British Lepidoptera, by having the desiderata marked thereon, and then circulated among those members who had duplicate specimens to give away. Messrs. A. F. Sheppard and Edwin Shepherd had so marked several of the lists, and the above donations of English Lepidoptera were the first result.

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J. N. Winter, Esq., Brighton, and M. H. F. de Saussure, Geneva, were balloted for and elected Members of the Society.

The President announced that the Society offered a prize of £5 5*s*. for the best essay on the Natural History of the species of Coccus injurious to fruit-trees in this country (with an especial reference to the "mussel-scale" of the apple, of which a full and particular account is to be given), and the best means of preventing their ravages.

The essays, each distinguished by a motto, and with the author's name in a distinct sealed envelope, to be addressed "To the President and Council of the Entomological Society," and delivered on or before the 31st of December next.

Mr. Spence exhibited specimens of a Thrips, received through Dr. Lankester from Dr. Theophilus Thompson, to whom they had been sent from Australia, where they prevented rose-trees from blossoming by eating the petals of the flowers.

Mr. S. Stevens exhibited a specimen of each of the rare Coleoptera, Agasma semicrudum and Calodera Kirbii, lately received from Australia.

Mr. T. Spencer exhibited a specimen of Chœrocampa Celerio, captured last October in the Regent's Park, and a scorpion, found last summer in the middle of a field at Edgeware.

Mr. Douglas, on the part of Mr. A. R. Hogan, exhibited the specimen of Hipparchia Janira, with six whitish appendages to the haustellum, respecting which he had sent an inquiry to the 'Zoologist' (p. 3775), and which Mr. Douglas had answered in the same journal (p. 3809), considering the presence of these bodies to be attributable to the adhesion of parts of flowers. Subsequent examination of the butterfly, kindly sent by Mr. Hogan, had confirmed this impression.

The President said he was convinced that Mr. Douglas was correct in his opinion, for not only did he find the appendages in question to be the pollen-masses of an Orchidaceous plant, but he identified the very species as Orchis bifolia. The pollen-granules were still distinctly observable at the distal extremity of the appendages, while the basal end, always extremely viscid, had fixed itself firmly to the maxillæ of the insect. These extraneous bodies are affixed to the maxillæ in very regular order, but he regarded their position as purely accidental; and the hairs observed by Mr. Hogan adhering to the pollen-masses were no part of the plant, but doubtless derived from the palpi or pectus of the butterfly. The occurrence of pollen-masses on various parts of insects had been repeatedly noticed by botanists as well as entomologists; they are very common on the heads of wild bees, especially in foreign countries, in such cases being not only derived from Orchids, but also from Asclepiads,—a natural order of plants which does not occur wild in this country, and which, although widely differing from the Orchids in other structural peculiarities, possesses similarly constructed pollen-masses. To such an extent has this phenomenon prevailed in some instances, that botanists have conjectured that Nature availed herself of the services of the bees to carry out the fecundating process, for many Orchids, without their assistance in conveying the pollen-granules from one flower to another, failed to mature their seeds. The pollen-masses are very carefully and accurately described by the late Sir J. E. Smith, Dr. Lindley, and other botanists.

The Secretary read the following notes, communicated by Professor Zeller, Honorary Member of the Society.

"*Impaled Insects.*—I only remember two examples of impaled insects, but both of them afford good evidence of the cause of their position. In one of these cases the

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insect was a suicide: a male Triphæna comes, *Tr.*, in the finest condition, had a point of the rush, Juncus acutus, in its breast, and was dead when I found it. I still keep the thorax in my collection; it is quite uninjured, which would not be the case if a bird had captured and impaled the moth. Besides, the locality, in the environs of Catania, is such as no Lanius would inhabit, being a small meadow, wet in winter, surrounded by a large lava-desert, without tree or shrub. Juncus acutus is the haunt of an Œdipoda which I think new, (*Œd. Junci*, mihi, in litt.); and I sometimes observed this insect, after a short flight, fall down and impale its wings on the pin-like points of the rush, and get them loose only after many efforts. That insects would be easily impaled here I was sure from my own experience, as when stooping quickly for any capture, I often found myself on these unhappy points almost in a Turkish fashion. The moth here spoken of is mentioned in the 'Isis,' 1847, p. 442.

"The other instance is of an earlier date, and happened to a Triphæna fimbria, *Tr.*, ♂. This insect was impaled on a sloe-thorn, and was still living when I found it. It had its *back downwards*, the wings on its right side *half bitten off*, and its thorax *much injured*. In the alder-brake where this happened, there were some Lanii (shrikes), the species of which I do not now remember."

"*Larva of Polyommatus Artaxerxes.*—From the affinity of this species with Polyommatus Agestis, I infer the possibility of its larva feeding on a species of Geranium or Erodium; for on Erodium cicutarium I have detected the larva of Agestis. If it be deemed probable that any species of these plants affords food to the larva of Artaxerxes, a quantity of them should be gathered at the proper season in the locality inhabited by the butterfly, by cautiously cutting them off above the roots, and they should then be torn and shaken over white paper or a table-cloth. But an undoubtedly better method of obtaining the larvæ is the following. Most butterflies are very easily observed laying their eggs, and the Polyommati are particularly favourable for such investigations. Therefore, when the females of Artaxerxes have been out some time, and begin to be wasted, patiently follow one on a fine morning without troubling it, and observe on what plant it settles; after some preliminary attempts it will probably be seen to bend its body under a leaf, which proceeding is a certain sign of its laying an egg; this may soon be recognized by its white colour. The female will continue to lay eggs for a long time without resting to feed, and thus in a short period a number of eggs may be collected. To prevent their drying up, they must be fixed upon leaves of a living plant set in a flower-pot, and thus every opportunity may be had for leisurely observing the larva during its changes. In this way I procured the eggs of and reared to perfection Argynnis Dia, Colias Hyale, Polyommatus Corydon, Alexis, Amyntas, Hylas, Arion (both the latter on Thymus Serpyllum), Argiolus, Acis (on the capitula of Armeria vulgaris), Phlæas, Circe, Hippothoë, Chryseis, &c., Leucophasia Sinapis (on Trifolium arvense and Coronilla varia), Papilio Machaon, Podalirius, Hesperia Actæon (on Stipa capillata), alveolus (on Potentilla alba, but I often find the larva on Potentilla anserina among alder-bushes), Emmelesia albulata (on Alectorolophus minor), and many others."

Mr. F. Smith read a monograph of the Hymenopterous genus Cryptocerus, including descriptions of 14 new species, and illustrated by outline figures of all the species known. Three new genera are established,—Meranoplus for two species having the body pedunculated and rounded in the female, Cataulacus for four species of

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the Old World structurally different from Cryptocerus, and Onychognathus for a single species from New Zealand remarkable for having only five joints in the antennæ.

Mr. Spence presented for the signatures of the members, a petition to the Government, originated by the Royal Society, praying that it and the other Societies for the study and advancement of natural knowledge, should be provided by the State with apartments in juxta-position; showing the disadvantages under which such Societies, and, through them, science, at present laboured, on account of their disconnected locations, and having severally to support heavy expenses for house-rent and other necessary charges.

Part 4, Vol. II., n. s., of the Society's 'Transactions,' was announced as ready.

April 4, 1853.

Edward Newman, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors: — The 'Zoologist' for April; by the Editor. The 'Athenæum' for March; by the Editor. The 'Literary Gazette' for March; by the Editor. The 'Journal of the Society of Arts;' by the Society. 'On two new Subgenera of Calanidæ,' by John Lubbock, Esq., F.Z.S., &c.; by the Author. Hewitson's 'Exotic Butterflies,' part 6; by W. Wilson Saunders, Esq. 'Descriptions des trois Coléoptères:' 'Descriptions des Coléoptères nouveaux:' 'Rappel des Coléoptères décrits par Palisot et Beauvais:' all by M. A. Chevrolat, and presented by the Author. Specimens of Coleopterous larvæ with a Sphæria attached; by T. J. Stevens, Esq., Bogotà.

T. H. Langcake, Esq., Beeston, near Leeds, and F. Bates, Esq., Leicester, were elected Subscribers to the Society.

Mr. T. Desvignes exhibited a fine Chœrocampa Celerio, taken by Thomas Thompson, Esq., at Welton, near Brough, Yorkshire; also a new British bee, — Anthidium maculatum, taken in Scotland by E. C. Buxton, Esq.

Mr. F. Smith remarked that this bee was common in the South of Europe; and it was curious and interesting, if no mistake had occurred, to find it first captured in Britain so far North as Scotland.

Mr. Bond exhibited a Steropus madidus, with a Filaria about 6 inches long protruding from the abdomen; also a Filaria, 15 inches in length, extracted from another specimen of the same species of beetle.

Mr. Douglas exhibited some young larvæ of a Solenobia, produced from eggs laid by females without male intercourse. Last July, at Charlton, he found larvæ moving about on the stem of a poplar tree; he put some into a box with a piece of the bark, and forgot them until recently, when he found they had produced apterous females only, and from them had been developed the larvæ now exhibited, which had died in the box where they were born.

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Mr. F. Smith exhibited some Bruchi reared from seeds of Sophora myrtillifolia from the Cape of Good Hope. Almost every seed had contained a larva of the Bruchus, from the greater number of them, however, only a parasitic Chalcis had emerged.

Mr. S. Stevens exhibited some fine insects, chiefly Lepidoptera, just received from Mr. Bates, on the Amazon River.

The following extract of a letter from Mr. T. J. Stevens, Corresponding Member, at Bogotà, was read.

"Having seen in the hands of my friend, Mr. Mack, our Consul, a dead larva with a fungus growing from the body, I was much struck with the curious appearance, and with some trouble procured specimens from Mr. Haldane, of Palmar, on whose estate they are found. I have forwarded to you four specimens, and now give you extracts from the information I received from Mr. Haldane, who is no naturalist.

"'The grub is in its glory and is decidedly brought to life in decayed timber. It is never to be found on trees, but underground, and in timber pulverously rotten. It does not attack the potato, and is to be found on lands where fern has been extirpated, but the roots still left behind in a state of decomposition. When found in the hard state it is always dead. Such specimens are scarce, and although I know where to seek, the difficulty is to find. Eight years elapsed after the first specimen was brought to me, ere I could meet with a second; but in a living state they are known to every clod-breaker. The body of the grub, when found in the hard state, does not become putrid in keeping, like other insects in general. The first specimen brought to me had a green bud protruding from the mouth, resembling a green pea when it first bursts the soil.'"

Mr. Andrew Wilson, of Edinburgh, sent a communication recommending chloroform as an agent for disabling the larger Lepidoptera before they are killed or pinned, instead of sulphur or German tinder; and stating that no danger to the person using it need be apprehended.

The Rev. Joseph Greene communicated the following corrections of his note read at the March meeting: —

"Since I wrote to you, I have been informed that the insect taken by Dr. Ball was Deilephila *lineata*, and not *Euphorbiæ*; and that the locality was *Youghal*, in the South of Ireland. In point of rarity, I believe there is not much difference between the two; but I thought it better to rectify the error. There is, likewise, one other slight mistake, which I should wish to correct. Instead of, in my collection are *two* specimens of Euphorbiæ and *one* of Galii, it should be, *one* of Euphorbiæ and *two* of Galii."

The following notes by the Rev. Joseph Greene, "On digging for pupæ of Lepidoptera," were also read: —

"Having met with considerable success in my search for pupæ of Heterocerous Lepidoptera, it has been suggested to me that a few remarks relative to localities, &c., might be useful to other collectors. This method of obtaining insects recommends itself to the entomologist in three ways. 1. As an amusement during the winter months. 2. As enabling him to procure fine specimens without the trouble of rearing. 3. As occasionally rewarding him with rare species, curious varieties, and others, which,

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from their habits or forms, are difficult to procure in the perfect state, *e. g.*, apterous or partially apterous females. During the past winter, I have found the pupæ of all the apterous females, except Nyssia zonaria and Cheimatobia borearia.

"Wherever in the following remarks any statement is made as to certain circumstances being uncommon, usual, or invariable, I wish it to be distinctly understood that they are so, merely so far as my own personal experience goes.

"The only instrument I use is a common garden trowel. The form is immaterial: perhaps a rounded blade is best, as passing with greater ease between the roots.

"The trees which I have found the most productive are the following: — elm, oak, ash, poplar, beech, and willow. I never found anything at birch, maple, or chesnut. Perhaps a short list of a few of the pupæ obtained at those trees may prove interesting.

"*Elm.* — Smerinthus Tiliæ (why this insect should be called the *lime* hawk-moth I know not; I have found dozens of pupæ at the roots of elm, but not one at lime), Petasia cassinea, Tæniocampa rubricosa, T. Populeti, T. munda, Cosmia diffinis, Xylina semibrunnea, Anisopteryx Æscularia ♂ and ♀, Hibernia leucophæaria ♂ and ♀, H. aurantiaria ♂ and ♀, &c.

"*Oak.* — Considering the number of larvæ that feed upon oak, I have been surprised at finding so few pupæ at it. This, I suppose, is partly owing to the fact, that a considerable number of the insects whose larvæ feed upon oak, do not pass the winter in the pupa state. However, when you do succeed in getting one, it is generally good; and I have found Notodonta trepida, N. Chaonia, N. Dodonæa, Geometra Papilionaria, Biston Prodromaria, &c. I was much surprised to find, on two occasions, the empty cocoon of Cerura Vinula on the trunk of an oak.

"*Ash.* — Pœcilocampa Populi, Acronycta Ligustri, Geometra Lunaria, G. illustraria, &c., &c.

"*Beech.* — This and the poplar are the best trees. At the former I have found Lithosia rubricollis, L. aureola, Orgyia Coryli, Notodonta Camelina, Tephrosia consonaria, &c.; at the latter, Phragmatobia mendica, Pœcilocampa Populi, Cerura bifida, C. furcula, Ptilodontis palpina, Notodonta Dictæa, N. Dictæoides, Clostera curtula, Ceropacha Or, C. ocularis, Ypsipites ruberaria, &c.

"And now a word with regard to *localities*. Meadows and parks with scattered timber trees are decidedly the best localities: being near a wood seems no advantage. It is, however, a very curious fact, that the nearer these meadows or parks are to inhabited places, as towns, villages, or even a single farm-house, the more abundant are the pupæ. I have observed this repeatedly, and in the most marked manner. I may mention two examples. Nine specimens of Notodonta Dodonæa were all obtained at the roots of an oak about a dozen yards from a farm-house; and though I searched upwards of forty trees in the neighbouring fields, I could not find a pupa of any kind whatever. At the same tree I found Biston Prodromaria and Tæniocampa Gothica. Again, the winter before last (1851-52), being in Dublin, I went to the Phœnix Park to dig. So long as I continued near the city, I found the commoner sorts of pupæ in plenty; but the further I retired from it, the scarcer they became: until, at about three miles distance, I could not find one. I should be very glad to see some explanation of this curious circumstance. Perhaps it may partly be accounted for on the supposition that the parent moth is attracted by the lights in the houses, and lays her eggs on the neighbouring trees.

"Next to parks and meadows I place woods. Searching in woods, however, is a tedious and fatiguing affair, and to search successfully requires some experience. Per-

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haps the following hints may prove useful. It is in vain to examine the *dense* portions; it is equally vain to dig at the *roots* of trees, with few exceptions: and you will rarely find anything, unless upon trees of considerable growth. The thick moss which collects about the trunks and roots, is the part to be examined. Bombyces are generally (almost invariably) found under the moss which covers spreading *roots*, and not on the trunks. The best localities in woods are the borders and open places. It is curious that such places when elevated, or facing the North, are generally the most productive.

"There remains one other locality — *hedge-rows*. These may be dismissed in a few words: it is perfectly useless to try them. I do not think I have found a dozen pupæ in such places: *why* it should be so I cannot tell. There are, of course, other localities, but as I have never tried them, I am unable to give any opinion on them.

"The next point which may be considered worthy of notice, is the mode of search. This, of course, varies according to locality. In digging, it must be borne in mind that all pupæ are close to the trunk of the tree, seldom more than 2 inches distant. Frequently the trunk of the tree forms one side of the cocoon, especially the cocoon of such insects as spin. Again, pupæ lie close to the surface of the earth, (I have seen those of Smerinthus Populi and S. Tiliæ half out of the earth); the larva of Calocampa exoleta is the only one I know of that goes to a considerable depth. Insert then the trowel about 3 inches from the trunk, to the depth of 2 inches or so; then push it to the tree and turn it up. If the soil be dry and friable, without grass, knock it gently with the trowel, which will be sufficient. If, however, there be grass, you must proceed more cautiously: take up the sod in the left hand, knock it very gently with the trowel, and those pupæ which merely enter the ground will drop out. To find those which spin, you must carefully examine the sod, tearing the roots of the grass asunder. These are, of course, much the most difficult to find, the cocoons being generally of the colour of the earth. I may here remark, that it is useless to try sticky or clayey ground, the caterpillars being unable to penetrate it. In searching under moss, the best plan is to loosen the edge, then to tear it gently off, observing whether any pupæ fall. Look at the trunk to see if anything adheres to it, and then carefully examine the moss itself. Experience alone will enable you to detect a spun cocoon.

"Searching under loose bark requires no comment: one observation, however, on the Ceruræ. I have heard it mentioned that the pupæ of the *kittens* are to be found near the *roots*: my experience goes to prove quite the reverse. Every one who has looked for them knows the extreme difficulty of detecting them. I found fifteen last autumn, and they were all, without exception, at least 2 feet from the ground. The puss moth certainly forms its cocoon near the ground generally, but not the kittens, I think. Though not connected with the subject of pupæ, I think it may be useful to mention that the larvæ of the genus Cerura are always found on the *upper* side of the leaf, generally about the centre.

"If I were asked which are the most likely trees, I should say those whose branches spread out towards the ground, since moths seldom fly to the high branches; those whose roots form an angle filled with loose dry earth, especially when covered with grass; and lastly, those which have a thick loose moss upon them. Nothing however can be more uncertain than any rules in this matter. You will perhaps see ten elm trees, to your eye exactly alike: at nine you may find nothing; at the tenth, possibly twenty or thirty pupæ. I remember, on one occasion, trying a number of ash trees, without the slightest success, and was about to give up the search as hopeless, when I

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resolved to try one more. At that one I found forty-six pupæ of Ennomos illunaria, and three of Pœcilocampa Populi!

"No pupa-hunter can hope for success, unless he have a good stock of patience and perseverance. He must not mind cold hands, wet feet, or an aching back; for although these are drawbacks, yet is the pursuit (to me) quite exciting, when successful, and it will reward the seeker, not merely of Lepidoptera, but also of all the other orders of insects.

"The longer I continue to dig for pupæ, the more convinced I am that one of the causes of the periodical uncertainty in the appearance of many insects is their inability, under certain circumstances, to force their way through the earth. As I have remarked, on a former occasion, severe frost following protracted rain will have this effect, as also will great heat. I once had a singular illustration of this. Digging at the roots of an elm, I turned up a large lump of baked clay. On breaking it, I found no fewer than sixteen pupæ of Tæniocampa instabilis imbedded in it: the shells were quite brittle, and on opening them I found the insect perfectly developed, but dead. Another cause which tends to make insects scarce or uncertain in their appearance, is, of course, the Ichneumon, that foe to the entomologist. The havoc committed by them would appear incredible to those who have not witnessed their destructive powers as I have, while digging for pupæ. Take, for example, Lithosia rubricollis. At Guiting I found the pupæ of this insect by hundreds. It is no exaggeration to say that three-fifths at least of these had been destroyed by Ichneumons. Their empty pupa-cases, with the circular opening always made by the Ichneumon, lay scattered about by dozens; and I have repeatedly liberated the parasite itself in turning up the sod.

"It may be asked—'How do you know the species of those pupæ which are as yet undisclosed?' To this I would answer, chiefly by experience. As a general principle, it is not difficult to decide to what family a pupa belongs. A Bombyx may sometimes be known at once by its form, which nevertheless varies considerably. Moreover, all Bombyces form a web or cocoon, at least all those with which I am acquainted in the pupa state. This, however, is by no means a decisive criterion, as some Noctuæ (Acronycta) and Geometræ (Tephrosia) do the same. Still, I think a Bombyx may be known with tolerable certainty, if attention be paid to the following peculiarities:—1. A web or cocoon. 2. The bulky form of the pupa, which is almost invariably either of a nearly uniform thickness throughout, and round, or else stout to the middle and rapidly tapering to a point. 3. The form of the antennæ (which is an excellent criterion) and the invariable shortness of the wing-cases: to this I call particular attention. The genus Lithosia, of which, however, I know only two species in the pupa state, is an exception to some of these rules. Examples of the rounded form will occur to every one, as Orgyia potatoria, Cerura bifida, C. furcula, &c. As an example of the tapering form I may mention Orgyia Coryli. Some of the genera, also, among the Bombyces may readily be distinguished by the form of the pupæ; I may mention in particular Notodonta. I think I could instantly detect a pupa of that genus from its form. I have either reared or found in pupa, Notodonta Camelina, Chaonia, Dictæa, Dictæoides, Dodonæa, Dromedarius trepida and Ziczac. In all these (with the exception of Camelina, which slightly differs) the pupa is round of a nearly uniform thickness, rounded at the anal extremity, and ribbed.

"The genus Lithosia is quite different. The pupæ which I have had (L. rubricollis and aureola) are short and stout, expanding somewhat in the middle, and tapering slightly towards each end.

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"The Geometræ are easily distinguished by their size and slender shape, except the genera Biston, Phigalia, Nyssia, and part of Ennomos. They are, moreover, the most active pupæ, except perhaps some species of the genus Acronycta.

"It seems to me quite impossible to assert, with any degree of certainty, to what subfamily or genus of Noctuæ or Geometræ a pupa belongs, or to assign any data by which to decide, except, perhaps, experience and observation; and even then, owing to the great resemblance of many species to each other, one is constantly liable to error. The tree at which a pupa is found will sometimes assist, as showing the food; but even this is uncertain, as I have found the pupæ of insects, whose larvæ are supposed to feed on only one particular tree, at many others. I believe, for example, that the larva of Acronycta Ligustri is said to feed on privet; I never took it there, but have found the pupa under moss on willow, beech, ash, and oak."

Mr. G. R. Waterhouse read a revision of the synonymy of the British species of the genera Hydrochus and Ochthebius, founded upon an examination of the specimens in the collection of the late Mr. J. F. Stephens, now in the British Museum; the result being that in the majority of instances the names given or adopted by Mr. Stephens, and for which others had been substituted on the continent, would remain.

Mr. Westwood hoped that advantage would be taken of the acquisition by the Museum of Mr. Stephens's collections, and the facilities of investigation thereby afforded, to work up other genera or groups of our indigenous insects. He was convinced that, as in the memoir just read by Mr. Waterhouse, one result would be the vindication of Mr. Stephens's reputation from the aspersions which, he was sorry to say, had recently been cast upon it abroad.

Mr. Westwood read a memoir intituled "Descriptions of new Species of Coleoptera from China and Ceylon," illustrated by figures of the principal species.

May 2, 1853.

J. O. Westwood, Esq., Vice-president, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for May; by the Editor. The 'Literary Gazette' for April; by the Editor. The 'Athenæum' for April; by the Editor. The 'Journal of the Society of Arts' for April; by the Society. 'Proceedings of the Berwickshire Naturalists' Club' for 1851; by the Club. 'Révision de la Famille des Cicindélides de l'Ordre des Coléoptères,' par Th. Lacordaire, Liége, 1842: and 'Monographie de la Famille des Phytophages,' par Th. Lacordaire, tome ii., Liége, 1848; both presented by the Author. 'Monographie des Guêpes Solitaires,' par H. F. de Saussure, Cahier 4, Paris, 1852; by the Author. 'Mémoires de l'Académie Royale des Sciences, des Lettres, et des Beaux-Arts de Belgique,' tome xxvi., 1851: 'Mémoires Couronnées et Mémoires des Savants étrangers,' tome xxiv. 1852: Ditto, in 8vo., tome v. 1re partie,

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1852: 'Bulletins de l'Académie,' tomes xvii. 2me partie, xviii. and xix., 1851—52; all presented by the Académie. Two book-cases, by Mr. Waring; and a set of book-shelves, by Mr. Edwin Shepherd.

The Chairman stated that in consequence of several inquiries from the apple-growing districts of the country, the Council wished him to announce that the "mussel-scale" of the apple, the insect whose natural history the Society had this year proposed as the subject of a Prize Essay, was the same as that known in many places as the "scale-insect" or "scale-blight" of the apple.

The Chairman also called the attention of the Meeting to copies of a Catalogue laid upon the table by Mr. Stainton, for distribution, intituled, 'Bibliotheca Stephensiana, being a Catalogue of the Entomological Library of the late James Francis Stephens, Esq., F.L.S., which has been preserved entire, and is now removed to Mountsfield, Lewisham, where it may be consulted by any entomologist, every Wednesday evening, as heretofore.'

Mr. H. Doubleday presented a beautiful drawing of the under side of a very singular variety of Polyommatus Alexis, taken near Cambridge by the Rev. Rudston Reid. The usual ocelli were absent, but on each wing was a row of strong black marks within the posterior margin, not extending outwardly beyond the red spots on the lower wings, and similarly situated on the upper wings, but there the red spots were wanting. Part only of the posterior ocelli were represented by black dots, (Pl. xvii. fig. 2).

Mr. Bond exhibited a specimen of a Psyche new to this country, pronounced by M. Bruand, who was engaged on a monograph of the Psychidæ, to be his P. marginenigrella. Mr. Bond reared it from a case which he found attached to a tree, either in Lancashire or Yorkshire.

Mr. Edwin Shepherd exhibited a larva of Notodonta Camelina, which had been attacked and killed by muscardine; a very pale and little-marked variety of Argynnis Euphrosyne; a unicolorous variety of Fidonia atomaria; and a specimen of the rare Aleucis pictaria, taken on the 24th of April last, on the palings at Dartford Heath.

Mr. S. J. Wilkinson exhibited larva-cases of Incurvaria Zinckenii and I. masculella. They were both of considerable size, and of a broad-oval form, each constructed of two pieces of leaf neatly cut out and fastened together at the edges; the former species from the leaf of oak, the latter from the leaf of birch. The perfect insects, which he also exhibited, had emerged, leaving the pupa-skin projecting from the case, showing that the larva had changed to pupa within the case. He also exhibited three specimens of the new Lithocolletis Nicellii, reared from nut-leaves, and a cocoon of a Bucculatrix? found attached to a fence.

Mr. Stevens exhibited specimens of the fine Goliath beetles, Amarodes Passerinii and Eudicella Smithii, lately received from Port Natal.

The Chairman read a note from Mr. Weaver, stating that the insect exhibited at the November meeting, reported as Bolitophagus crenicollis, should be B. crenatus; and that another Coleopterous insect should be added to his list of discoveries in Scotland, namely, Ampedus tristis, belonging to the family Elateridæ.

The following letter was read: —

"Liverpool, April 30, 1853.

"Sir,

"Perhaps the following hints may not prove uninteresting to some of the members of your Society. At your meeting on the 4th of April, a communication

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was received from Mr. Wilson, recommending chloroform as a means of disabling large Lepidoptera before pinning or killing them. Some years since, when in Switzerland, I took great delight in making a collection of Lepidoptera, and invariably found that the easiest way of killing the insects was by dropping sulphuric ether on their heads. This suffocates them immediately, excepting the very large kinds, and then a second dose is generally needed. In this manner I have killed Papilio Podalirius, Parnassius Apollo and Mnemosyne, Apatura Iris, Acherontia Atropos, Sphinx Convolvuli, S. Ligustri, S. Pinastri, Chœrocampa Nerii, &c.

"When the insect is captured and killed, Mr. Humphreys, in his beautiful book, mentions that 'the wings must be kept expanded by thin braces of card.' An easier plan is to have a flat board, with grooves of various sizes to receive the bodies, and then to keep the wings expanded by small pieces of glass until dry. The advantage is, that the glass presses equally all over the wings, and also that you can always see whether they are in their proper position or not.

"I remain, Sir,

"Your obedient Servant,

"J. W."

"To the President of the Entomological Society."

Dr. Dutton said that he preferred hydrocyanic acid to all other agents for destroying life in insects. He had found one drop, of Scheele's strength, sufficient to kill fifty insects; and, so small a quantity being necessary, no danger to the operator need be apprehended.

Mr. Spence communicated the following note on Termes lucifugus:—

"As the small yellow ant (*Myrmica domestica*), now become such a pest in London, might probably have been easily extirpated, had it been brought under the eye of entomologists on its first introduction from abroad, it may not be amiss to direct the attention of the members of the Society to the possible importation of a still worse pest, the Termes lucifugus of Rossi. The ravages of this minute white ant (first discovered in France at Bordeaux by Latreille), at Saintes, Rochefort, and Tournay-Charente, in the western departments of France, were described by M. Audouin twenty years ago, and the accuracy of his observations has been since confirmed by those of MM. Milne-Edwards and Blanchard in the same localities; but it appears from a paper read before the Académie des Sciences at Paris, on March 28, by M. de Quatrefage, that this insect has now found its way also into the Port of Rochelle (interesting to entomologists as the birth-place of Réaumur), where it is rapidly extending itself; and how easily it might thence be brought to our ports in the West of England, where it would find a temperature probably as well suited to its propagation as at Rochelle, need not be pointed out. This species, as Latreille observed, and as M. de Quatrefage informs us, does not confine itself to dead wood, but attacks living plants and trees, having excavated the stems and tubers of Dahlias, and the trunks and larger branches of poplars. He found chlorine the most effective agent for its destruction."

The Chairman said Dr. Burmeister had shown him the same Termes from the South of Prussia.

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Mr. Stainton communicated the following extract of a letter from Count Nicelli:—

"Lithocolletis Scabiosella, *Douglas*, is a very good species. However, it is not the only species on low-growing plants, for Herr von Heyden, of Frankfort-on-the-Maine, sent me a very beautiful species, something like lautella, bred from a species of Vicia; it is L. Bremiella. Besides this, I may mention L. Sagittariella, a species allied to Faginella and Mannii, bred from broom; and another, named by him L. Staintoniella, which is allied to L. Betulæ, but much smaller, and feeds on broom."

Mr. Westwood mentioned that by a careful examination of the fragments of the Chinese wax-making Coccus, given to him by Mr. Hanbury, he had been able to find wings of the male, and dried bodies and some other parts of both male and female, so that he now thought he could make a sufficient description of both sexes of the species. He had also found three species of Encyrtus parasitic on this Coccus.

Mr. Westwood also informed the meeting, that specimens of a blind shrimp, found in a well near Maidenhead, had been sent to him, and that he had identified them as the Niphargus Stygius of Schiödte, found in the caves of Carniola, and of which a figure, description, and account were published in the Society's 'Transactions,' vol. i. n. s. The well in question was about 18 feet deep, and these Crustaceans abounded in it to such an extent, as to render the water unfit for use. The well had been cleaned out, but the shrimps were still there, though to a less extent.

June 6, 1853.

Edward Newman, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors: — The 'Zoologist' for June; by the Editor. The 'Athenæum' for May; by the Editor. The 'Literary Gazette' for May; by the Editor. The 'Proceedings of the Zoological Society,' No. 201—226, and the 'Transactions of the Zoological Society,' Vol. vi. part 3; by the Society. The 'Proceedings of the Royal Society,' Vol. vi. No. 95; by the Society. 'Revue et Magasin de Zoologie,' 1853, No. 3; by M. Guérin Méneville. 'Entomologische Zeitung' for February and March; by the Entomological Society of Stettin.

Mr. Waring exhibited a fine pair of Notodonta trepida, bred by Mr. B. Standish from larvæ found on oaks.

Mr. Bond exhibited some beautiful specimens of Anticlea Berberata, bred from larvæ found on the berberry, in Cambridgeshire, last year.

Mr. Wilkinson exhibited Lithocolletis Stettinensis, *Nicelli*, a new species bred from caterpillars found in the leaves of alders last year.

Mr. Stevens exhibited a fine pair of Notodonta Carmelita, and part of another specimen found in a mutilated condition, all taken at Black Park, Bucks, on May 8th.

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Mr. Douglas exhibited Catoptria Albersana, and a drawing of the larva from which it was bred. The latter he found at Wickham, in September last, in a leaf of honeysuckle, which it had converted into a dwelling by making a fold along its entire length.

Mr. Boyd brought for distribution specimens of Tephrosia consonaria, recently captured in Buckinghamshire.

Mr. Westwood mentioned some curious circumstances that had lately occurred amongst his bees. About ten days since a hive threw off a swarm, which settled at the entrance of the next hive, the inhabitants of which resisted the intruders, and much fighting occurred. Mr. Westwood interfered, and removed the queen; having released her, she immediately led the swarm to the entrance of another hive, where the same scene of confusion again occurred: a second time he took her away, and placed her upon a rose-bush, whence she took flight, and, he supposed, returned to the hive from which she originally came, for the swarm soon returned to its parent abode, and from this hive today a fine swarm came forth.

Yesterday another hive sent out a swarm, which joined a swarm from a neighbouring hive settled about forty yards distant, and both of them remained in one hive. There was much fighting, and as many bees were killed as would fill a pint measure; but today they seemed to be amicably settled, whence he presumed that one of the queens had been put to death. The junction of these swarms seemed to imply the influence of some attraction upon one of them by the other, or a communication between them.

Mr. Waring knew an instance in which four swarms joined and remained together, the hive having to be greatly enlarged to hold them. In the Exhibition of 1851, was a case containing six swarms, but these had been artificially brought together.

Mr. Wallace read a paper "On the Insects used as Food by the Indians of the Amazon," enumerating species of five Orders which are sought for and eaten with avidity.

Mr. Douglas read a continuation of his "Contributions to the Natural History of British Micro-Lepidoptera," consisting of illustrations of the transformations of the genera Bedellia and Elachista.

The President announced the publication of Part 5 of the current volume of the Society's 'Transactions,' and that the Prize Essay on the duration of life in the Honey Bee was reprinted for separate sale.

July 6, 1853.

Edward Newman, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for July; by the Editor. The 'Athenæum' for June; by the Editor. The 'Literary Gazette' for June; by the Editor. The 'Journal of the Society of Arts' for June; by the Society. 'Entomologische Zeitung' for April and May; by the Entomological Society of Stettin. 'Journal of the Royal Agricultural

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Society of England,' vol. xiv. part 1, 1853; by the Society. 'Exotic Butterflies,' part 7; by W. Wilson Saunders, Esq. 'Monographie des Guêpes Solitaires,' par H. F. de Saussure, Cahiers 5 et 6; by the Author. 'Abhandlungen über eine neue Daphnieart, Daphnia aurita, und über die Daphnia laticornis, *Jurine*,' von Dr. Sebastian Fischer: 'Abhandlungen über die in der Umgebung von St. Petersburg vorkommenden Crustaceenans, der Ordnung der Branchiopoden und Entomostraceen,' von Dr. Sebastian Fischer: 'Ergänzungen, Berichtungen und Forsetzung zu der Abhandlung über die in der Umgebung von St. Petersburg vorkommenden Crustaceen,' von Dr. Sebastian Fischer: all presented by the Author.

R. F. Logan, Esq., of Duddingston, near Edinburgh, was balloted for and elected a Member of the Society.

Mr. F. Smith exhibited a large box of insects, captured this season in Scotland by Mr. Foxcroft, and sent as a sample of the species to be distributed among his Subscribers. There were many fine and rare species, including Notodonta Carmelita among the Lepidoptera, and Astynomus ædilis among the Coleoptera.

Mr. Janson exhibited some insects taken on the occasion of the Society's visit to Mickleham, on the 25th of June; including the very rare moth, Pachetra leucophæa (or the species known by that name in England), and the following rare Coleoptera:—Claviger testaceus, Baris picicornis, and Sphærosoma Quercûs.

Mr. Tebbs exhibited Notodonta trepida, which was attracted to a light at Highgate.

Mr. Weir exhibited the scarce Aplota palpella, bred from Genista tinctoria, growing at Pembury, near Tonbridge Wells.

Mr. Hunter exhibited a living larva of Limenitis Sibylla, found on honeysuckle at Black Park.

Mr. Bond exhibited Hydrilla caliginosa, ♂ and ♀, lately taken in the New Forest.

Mr. Stevens exhibited the rare Curculionidous beetle, Plinthus caliginosus, from West Wickham; the exceedingly rare moth, Chariclea Delphinii, the larva of which he thinks he took last year near Arundel; and a specimen of Aplecta nebulosa, with a pollen-mass of a flower attached to each eye.

Mr. Waring exhibited two living mole-crickets; on which Mr. Douglas remarked that he once had two of these insects together in a box, and in a short time he found they were both dead, and greatly mutilated by each other.

Mr. Carter exhibited a Cucullia umbratica, with a number of flower-anthers attached to its head; and Aphelia pratana, with a Gordius? protruding from its abdomen.

Mr. Douglas exhibited Laverna ochraceella, *Curtis*, bred from leaves of Epilobium hirsutum, in which the larvæ mine and make their cocoons,—a discovery of Mr. Jordan, of Teignmouth. He also exhibited the larva, pupa, and imago of Aræocerus Coffeæ, *Fab.*, a beetle belonging to the family Anthribidæ, which he had found in considerable quantity, feeding upon and doing great damage to mace imported from India.

Mr. Edwin Shepherd exhibited Retinia Turionana, from West Wickham; and Madopa Salicalis, Spilonota simplana, Chrosis Audouinana, Eupithecia Succenturiata, and Röslerstammia perlepidella, from Darenth Wood.

Mr. Westwood exhibited Hylobius Abietis, a beetle usually found on young pines, but this season discovered to be destructive to plum and peach trees in some districts; Coleophora Lusciniæpennella, reared from leaves of rose-trees, to which the larvæ had done considerable damage; Ourapteryx Sambucaria, with its pupa, directing attention to some peculiarities of the latter not hitherto noticed, as the dilation just above the very acute terminal point, and the number of small recurved hooks by which it

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attaches itself to the threads of its cocoon; and the imago and transformations of Lampronia corticella, *St.*, the larva of which feeds in the buds of raspberries, remarking especially upon the singular manner in which in the pupa the haustellum is rolled up laterally. He also read the following letter: —

"Small Arms Office,
"Birmingham, June 13, 1853.

"Sir,

"In the translation of that very interesting book of Kollar, on 'Insects injurious to Gardeners and Foresters,' I have sought for the history, habitat and description of those insects which infest and destroy the timber in our store-houses, and more especially those which attack walnut-wood in preference: but I find only a very slight reference to the Anobium, as being the cause of that I would proceed against. I am no entomologist, not from want of inclination, but of time; but being concerned in the care and conservation of a very large store of rough musket-stocks in the public magazines, every recurring season makes me more anxious to devise, if possible, some means of defence against the insidious enemies known amongst workmen under the general name of 'the grub.'

"It is upon these grounds that I trust you will pardon me for troubling you with a few questions. Some fourteen years ago I received valuable help and information from your Society upon the subject of an insect of the Bostrichus tribe, which I had unwittingly imported through Marseilles, and I am now induced to come again for help against our indigenous enemies.

"The beetles that I send inclosed are some that were taken off piles of walnut-stocks at Weedon, last week; I found some of the larvæ also — small white maggots, not larger than a horse-hair—but these were lost on the way home.

"1. Will you have the goodness to give me the proper name of this particular insect, and the family that it belongs to?

"2. At what season of the year does the parent beetle deposit her eggs?

"3. In what period of time from that are the larvæ hatched?

"4. Do they (the maggots) penetrate into the wood *immediately* after coming out of the egg?

"5. How long do they remain feeding in the wood, or lying dormant in the pupa state, before emerging as perfect beetles?

"6. Does the course of transformation of this tribe of beetles take place more than once in the same year?

"7. My observation leads me to the conclusion that the first palpable external sign of the grub having been in the wood, is the hole made by the perfect beetle in coming out: is this opinion well founded?

"Trusting to your good offices, I pray you to believe me,

"Sir,
"Your very obedient Servant,
"Geo. Lovell,
"H. M. Inspector of Small Arms."

"J. O. Westwood, Esq."

Mr. Westwood exhibited the beetle referred to—Latridius lardarius, and said that the habits attributed to it did not agree with its economy, for it was well known to

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feed upon dried animal matter and provisions, and never upon wood; so that he thought it was not the real depredator, and he now awaited a reply to a communication to this effect which he had made to Mr. Lovell.

Mr. Douglas read the following note: —

"In the 'Entomologische Zeitung' for May, is a note by Dr. H. Hagen, upon a work published in London in 1773, intituled 'A Decade of Curious Insects: some of them not described before, shewn in their natural size, and as they appear enlarg'd before the Lucernal Microscope, in which the Solar Apparatus is artificially illuminated: with their History, Characters, Manners and Places of Abode; on ten 4to plates and their explanations, drawn and engraved from Nature by J. Hill, Member of the Imperial Academy.' This work, Dr. Hagen says, has been rendered notorious by the remark of Fabricius in his 'Species Insectorum' (Pref. p. 8), — 'at damnandæ memoriæ J. Hill, qui decadem Insectorum Londini 1773, 4to, figuris fictitiis edidit.' After quoting on this point a remark of Percheron, in his 'Bibliographie,' — 'C'est une question que l'on peut examiner de nouveau, maintenant que l'on possède tant de matériaux que Fabricius ne connaissait pas,' — Dr. Hagen goes on to say, for reasons which he gives, that he does not think the figures are fictitious; at the same time allowing, that even for the period at which they appeared, they are very bad, and that the descriptions are no better. As an example, he gives the remark upon Alucita pallida: — 'A studious gentleman, very subject to the headache, sneezing one day with violence, as he was writing, saw some atoms a moment afterward upon a sheet of white paper that lay upon his table,' &c. This, he says, 'Westwood, in his 'Introduction' (vol. ii. p. 5), quotes without further remark, so that he does not seem to have suspected any deception. Stephens, and all the other English authors, entirely ignore Hill's work, and yet his figures are not worse than fig. 3, tab. 6, in Harris's 'Exposition,' from which Stephens, without any remark, makes out Cænis Harrisella, a new, and, to him, unknown species.'

"Dr. Hagen gives the following remarks upon Hill's figures, and adds that he should be happy to hear the opinions of other, *and particularly English, entomologists*, on this matter: —

"Tab. 1. Tenthredo luctuosa, from Uxbridge. (A small Hymenopteron).

"Tab. 2. Tenthredo variegata, from England. (A small Hymenopteron).

"Tab. 3. Sphex pectinipes, from Ireland. (Not to be made out).

"Tab. 4. Myrmeleon Formicarium, from France and Italy. (Doubtless M. tetragrammicum).

"Tab. 6. Cynips Quercûs-folii, from Norway. (Bad, but a Hymenopteron).

"Tab. 7. Ephemera Culiciformis, from Esher, in England. (Very bad, but certainly a small species of Perlidæ).

"Tab. 8. Ephemera rupestris, from London. (Very bad, but doubtless a small Phryganea).

"Tab. 9. Alucita pallida, from England. (A very small Thrips).

"Tab. 10. Alucita fulva, from England. (A Phlœothrips)."

Mr. Westwood said the figures were very bad, and that it was scarcely possible to recognise the species; and with regard to the insects which "the studious gentleman" sneezed, he thought it probable that he had previously drawn them into his nose by smelling flowers.

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Mr. S. Stevens mentioned that one evening, at Mickleham, he saw many Noctuæ attracted to one particular thistle, and upon investigation he found it covered with Aphides and their sweet secretion.

Mr. Wing said he had seen both Noctuæ and Geometræ attracted by the secretion of Aphides on gooseberry-bushes; and Mr. Westwood alluded to the well-known attraction to bees of the honey-dew deposited by Aphides on the leaves of trees.

The President announced that a second field-day excursion of the Members of the Society and their friends, would be made to West Wickham Wood, on the 9th of July.

August 1, 1853.

Samuel Stevens, Esq., F.L.S., in the chair.

The following donations were announced, and thanks ordered to be given to the donors: — The 'Zoologist' for August; by the Editor. The 'Athenæum' for July; by the Editor. The 'Literary Gazette' for July; by the Editor. The 'Journal of the Society of Arts' for July; by the Editor. 'Bulletin de la Société Impériale des Naturalistes de Moscou,' Nos. 3 and 4, 1851, No. 1, 1852: 'Die Coleopterologischen Verhaeltnisse und Käfer Russlands,' von Victor v. Motschulsky: both by the Soc. Imp. Nat. Moscou. 'Bericht über die wissenchaftlichen Leistungen im Gebiete der Entomologie wahrend des Jahres 1851,' von Dr. H. Schaum; Berlin, 1853: by the Author. 'Catalogue of the Coleoptera of Scotland,' by Andrew Murray; Edinburgh, 1853: by the Author. 'Abhandlungen der Mathemat.-Physikal. Classe der Koeniglich Bayerischen Akademie der Wissenchaften,' 17 Band, 1st abth., Munchen, 1853: Bulletin ditto, No. 25: 'Ueber den Chemismus der Vegetation,' von Dr. A. Vogel jun., Munchen, 1853: all by the Akademie. 'Transactions of the Linnean Society,' Vol. xxi. part 2, 1853: 'Proceedings of the Linnean Society,' Nos. 48—51: 'List of the Linnean Society;' all by the Society. 'Proceedings of the Royal Society,' Vol. vi. No. 97; by the Society. Two specimens of Boletophagus crenatus; by Mr. Foxcroft.

Viscount Goderich, M.P.; Captain Cox, Queen's Body Guard; and Henry Evans, Esq., Darley Abbey, near Derby, were balloted for and elected Members of the Society.

Mr. Stevens exhibited a female of the rare Pachetra leucophæa? taken flying at Mickleham, in July; and an almost black variety of Hadena dentina, from the same place.

Mr. Wilkinson exhibited living larvæ of Incurvaria masculella in their cases, feeding upon leaves of beech and hornbeam externally, having in a young state fed within the cuticles, of which the cases were formed.

Mr. Smith exhibited a very large Boletus, found by Mr. Foxcroft on an old birch-tree in the Black Forest, Rannoch, from which he had extracted Boletophagus crenatus. He also exhibited a large quantity of Mr. Foxcroft's captures of Coleoptera, Lepidoptera, and Hymenoptera in Perthshire, including many rare species, and among the Coleoptera, Lampyris splendidula? a new British species.

Mr. Douglas exhibited Ino Globulariæ, taken at Cheltenham in July, being a new

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locality for this species; also Heliothis marginata, and twelve other species of Noctuidæ captured at the same time and place, flying at dusk about the flowers of Silene inflata.

Mr. Bond exhibited some leaves of parsnep from Cambridgeshire, affected with the same disease as the potatoes, which the growers think is caused by insects. He however had only found on them a few minute Aphides, Psoci, &c., which he now handed to Mr. Westwood for examination.

Mr. Edwin Shepherd exhibited a remarkable variety of Anticlea rubidata, in which the ordinary broad band on the fore-wings had been converted into a narrow fascia.

Mr. Stainton exhibited an insect, captured by Mr. Boyd in the New Forest, closely resembling a Lepidopterous Nepticula or Elachista in its size, brilliancy, colour, and marking, but which was in reality Trichopterous, and probably of a new genus.

Mr. Westwood exhibited a new entomological product from the interior of Tropical Africa, near the Bight of Benin, consisting of a mass of the cocoons of one of the Lepidoptera, probably allied to Galleria, which was found loosely attached to trees. It formed a spongy-looking silky body, which, from the agglomeration of the multitude of cocoons, could not be wound off like ordinary silk, but had to be carded, like wool. He also exhibited the material as it appeared in two subsequent stages of manufacture, in which it resembled floss silk; from this it was spun into threads, then mixed with cotton, and woven into articles of different kinds, which have a strong texture. This substance would probably be turned to account, for several silk-manufacturers had seen it, and thought it might prove a desirable addition to our materials for textile fabrics. He also exhibited some dyed silk from the same country, which he thought was the product of another insect.

Mr. Westwood read from the 'Gardeners' Chronicle' a recommendation of chloroform as an agent for stupefying bees, when such a proceeding, for the purpose of taking honey, or from any other cause, was necessary in the apiary, in preference to sulphur or fungus.

Mr. Westwood then read from the Boston (U. S.) 'New England Farmer' of July 2nd, the following account, headed "A new Enemy in the Field;" stating that Dr. Harris had not noticed this caterpillar in his writings on injurious insects: —

"Within the past three days, we have noticed on our apple-trees a small worm, which threatens destruction to our most valuable crop. His manner and size are much after the style of the canker-worm, but his personal appearance is different. Like the canker-worm, he devours the leaf all but the tough fibres, and if you suddenly shake the tree, spins down on his thread like a spider, and he leaves the tree looking as if seared by fire."

"The canker-worm, if I recollect aright, when he visited New Hampshire twenty years ago, was always of a dark colour, and moved soberly *by measure*, while these creatures are of all colours, black, brown, green and striped, and they slip off your hand with a sort of *waltzing* step, in a second."

"I have travelled from Chester, through Raymond and other towns, home today, and have observed them all along. They are abundant, not only on the apple-tree, but on the plum, and on the white and red oak. The peach, which promises a great crop this season, seems to be free from them. Probably Professor Harris can tell us all about the animal in a moment."

"H. F. French."

"Exeter, N. H., June 20, 1853."

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Another communication was as follows: —

"In our vicinity an enemy has appeared upon our fruit-trees, the apple and the cherry, which threatens to destroy our entire crop. So far as I can learn, the foe is a stranger to our fruit-growers; it is spread upon all parts of the tree, and, when it is shaken, drops from it suspended by a web, then winds up its web, and again gains its position on the tree. The trees, when badly eaten, present a dry and sere appearance. In all these points it is like the canker-worm, as it is also in size, and to a casual observer it would be pronounced their work; but in many respects it is dissimilar. The canker-worm is brown, this is nearly white, with two longitudinal stripes running its whole length; the canker-worm is slow of motion, this is very quick, and moves rapidly from place to place in all directions, to escape an enemy; the canker-worm moves forward by doubling or opening and throwing forward its head and fore part, this is provided with 16 legs,—6 near the head, 8 near the middle, and 2 at the tail, and uses them with great celerity in running. The canker-worm has no shelter upon the tree, but lies out upon the leaf or branch; this forms itself a house by webbing the corner of a leaf, into which it retreats on the first appearance of danger: the canker-worm rarely eats the fruit, if it can get leaves; this is now eating into and spoiling and disfiguring the fruit. Of the insect which produces them I know nothing. My neighbours say that about three or four weeks since they noticed an abundance of small millers, of an ash colour, and they may have proceeded from them. If the insect, with its habits, are unknown, we have before us a work of careful observation, as the first descent of these depredators threatens more injury to our fruit than any other insect which has attacked our trees. If there are not enough to spoil my trees and fruit entirely now, I am sure that double the present number on those of my trees most eaten, would not leave me an apple or a leaf remaining.

"R. C. Stone."

"Sherburne, June 21, 1853."

The Editor adds: — "Shaking the trees pretty freely dislodges them. We advise this practice, and also syringing the young tree well with whale-oil-soap, strong soap-suds, or even clear water. We understand that muriate of lime will destroy them, by sprinkling the ground with it, and shaking the worms down upon it."

Mr. Wollaston communicated an extract of a letter from Dr. Schaum, informing him of the death of Dr. Germar on the 8th of July, from an attack of gout, at the age of 66.

Mr. Smith read some "Observations on the Economy of Pompilus punctum," showing that P. petiolatus, *Vander Linden*, is the female of that species, which fact he had ascertained by breeding both from one set of cells, found by the Rev. W. Delmar, at Elmstone Rectory, near Canterbury, and communicated to him by Mr. W. Thomson, Director of the Natural-History Department at the Crystal Palace.

Mr. Douglas read the following extract from Layard's 'Discoveries in the Ruins of Nineveh and Babylon,' 1853, page 338.

"*Ruins at Konyunjik.* — The walls were panelled with sculptured slabs about six feet high. Those to the right in descending represented a procession of servants carrying fruit, flowers, gum, and supplies for a banquet, preceded by mace-bearers. The

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attendants who followed carried clusters of ripe dates, and flat baskets of osier-work filled with pomegranates, apples, and bunches of grapes. They raised in one hand small green boughs to drive away the flies. Then came men bearing hares, partridges, and dried locusts fastened on rods. The locust has ever been an article of food in the East, and is still sold in the markets of many towns in Arabia. Being introduced in this bas-relief amongst the choice delicacies of a banquet, it was probably highly prized by the Assyrians."

Mr. Douglas also read the following translation from the 'Entomologische Zeitung' for April, of a "Report by Professors Goeppert and Cohn, of a Lecture by Professor von Siebold on Strepsiptera, at a meeting of the Silesian 'Gesellschaft für vaterl. Cultur,' at Breslau, on the 9th of February."

"The Strepsiptera form such a remarkable and isolated group of insects, that the oldest French and English entomologists, who were the first to draw the attention of the naturalist to these exceedingly rare insect-parasites, raised them into a distinct Order. In Germany they remained almost entirely unnoticed; indeed, the ignorance of this interesting group was so great, that up to a very late period no account of it exists in any German zoological hand-book. The lecturer, at different times, in journals and papers of scientific Natural-History Societies, has published his observations upon the very singular organization of the Strepsiptera, so different from that of all other insects, and upon the history of their wonderful propagation, without having had here in Germany these communications completed or extended by others; whilst in England, they appear to be peculiarly fortunate in discovering and observing these insects. Through the researches of English entomologists, we know up to this time 14 species of Strepsiptera, in 5 genera; among which are 11 European species. In order not to repeat what the lecturer published on the Strepsiptera some years since, he referred to the last paper on the subject in the Proceedings of the 'Naturforschenden Gesellschaft of Danzig,' Bd. iii. Heft 2, 1839; later in the 'Entomol. Zeitung,' 1843, p. 113, and in Wiegman's 'Archivs für Naturgeschicte,' 1843, Bd. i. p. 137. Herr von Siebold has continued, in Freiburg, the investigations into the Strepsiptera which he had commenced in Danzig and Erlangen, where it was easy for him to procure his materials: here in Breslau he laboured in vain to obtain Strepsiptera; and none of the many able Silesian entomologists could give him an idea where and how to procure these insects. Herr von Siebold hopes therefore, after his approaching return to South Germany, again to renew his researches, and to be able to complete his Monograph of the Strepsiptera. The reason why he now speaks about them is, that in the last 'Catalogus Coleopterorum Europæ,' published by the Entomological Society of Stettin, the Strepsiptera are presented as a family of beetles, under the name of 'Stylopites.' The Strepsiptera have had the fate to see themselves classified in all the hitherto known Orders of insects, by those entomologists who would not acknowledge them to be a distinct Order. The first proposition to bring the Strepsiptera among the Coleoptera, was put forth by Burmeister (in his 'Handbuch der Naturgeschichte,' 1837, p. 643), without giving any further reason for his supposition that they should occupy their natural position among the family Mordellidæ: he was merely led thereto by the idea that the larvæ of Strepsiptera are parasites on bees, and the larvæ of Symbius and Rhipiphorus, belonging to the Mordellidæ, also live as parasites, the former on Blatta, the latter on Vespa. This view of Burmeister has recently been supported

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in England, by Newman ('Zoologist,' 1850, p. 2684), who endeavours to prove that the Strepsiptera are genuine Coleoptera. We find the grounds of his arguments stated in extracts in the entomological 'Jahrsbericht' of Wiegman's 'Archivs,' (1851, Bd. ii. p. 200). Herr v. Siebold is not convinced by the reasons given, that the Strepsiptera are beetles. The resemblance of the larvæ of Strepsiptera to those of Meloë is referred to, but that is only very superficial; the latter have the parts of the mouth distinctly developed, in the former they are entirely wanting. In both sexes of beetles the parts of the mouth are always developed into very perfect biting organs; in the male of the perfected Strepsiptera they are reduced to two rudimentary jaws, and in the female they are entirely absent. The prothorax in all beetles is seen very strongly developed, and the upper part forms a large surface, furnished with many characters indicative of genera and species; while, in the Strepsiptera, this upper side of the prothorax has almost entirely vanished. The reduced and somewhat spirally twisted fore wings of the Strepsiptera are very movable appendages, and occupy the position of anterior halteres (Schwingkolben), corresponding to the hinder halteres of the Diptera; in beetles, the fore wings are simply coverings for the hind wings, and in flight are merely lifted up and held immovable, whether they are diminutive or not. All the male Strepsiptera want the claws of the last joint of the tarsi, an apparatus so necessary for Coleoptera, which use their legs in running, climbing, and clinging, that all species are provided therewith; moreover, they live for months, and even years, after they have thrown off their pupa-covering, whereas the male Strepsiptera, from the moment they emerge from the pupa, flutter incessantly, and do not live longer than a day. Though Herr v. Siebold is now convinced that the Strepsiptera are not Coleoptera, he still thinks that the attempt made by entomologists to place them in that position, must be borne with, and even received with welcome, as it has very good practical advantages, from which science may very shortly derive benefit. Hitherto, the entire group of Strepsiptera has been neglected in an unprecedented manner by German entomologists, but now, since Coleopterists find the Strepsiptera incorporated into the Catalogue of Coleoptera, they will be induced to adorn their collections with these pretty little creatures. They will now pay attention to these insects, will capture and pin them, and so must study the circumstances of their existence; they will be compelled to observe them, and the insects in which they live, with the greatest attention, for this is absolutely necessary, if they wish to possess winged Stylopidæ. In this way, observations and communications respecting these hitherto little known creatures will be amassed, from which hereafter the scientific position of these insects will stand out with greater certainty. As the lecturer has already been called upon by several Coleopterologists to indicate some means by which these Strepsiptera may be procured, he thinks it right to recommend the following method of rearing them, which has even now proved to be very useful; as it is only by breeding that one can obtain possession of the winged males, for, on account of their smallness, tenderness, and short, hidden life, they can only very rarely and casually be taken at large. In the first place, a spacious, light, and airy cage or apartment (Zwinger) must be prepared, in which flowering Umbelliferæ (which are eagerly sought by Hymenoptera) may be placed, and kept fresh by water in glasses; then, nothing must be thought of the trouble of catching the Apidæ and Andrenidæ which frequent the flowers of the sallows, and examining whether they are Stylopized or not, and then carefully placing in the aforesaid cage those which are Stylopized, which may easily be distinguished from those that are not Stylopized. One proceeds in the same manner with the Stylopized

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Vespidæ (Polistes gallica) and Sphegidæ (Ammophila sabulosa), which are found abundantly on Umbelliferæ. These insects, although as captives they at first miss their usual employment and care for their brood, live in their cage for several weeks, especially if they are from time to time supplied with fresh flowers of Umbelliferæ spread over with pounded sugar. Being accustomed to work, they are thus provided with employment; they busy themselves on the flowers, and lick up the sugar, and their life is prolonged as long as possible, so that the pupæ of the Stylopidæ contained in their bodies obtain time to develope, and (in the case of the males) emerge as winged insects. The Stylopized Hymenoptera are known in the following manner: — The larvæ of Strepsiptera living as Entozoa in the cavity of the hinder part of the body of Hymenoptera, eventually, when about to assume the pupa-state, with the fore part of the body pierce through the soft portion between the hinder segments of the body of their foster-parent, where they continue to remain, so that the ever wingless and footless females end their lives there; the males, after a time, thrust the prominent forepart of their pupa-case out of the hinder part of the body of their foster-parents, and flutter out of their confinement. The Hymenoptera which are burdened with male pupæ, are known by the dark brown conical fore ends of the pupa-cases projecting between the segments of the bodies of the bees and wasps; the female Strepsiptera are distinguished by the light brown scale-formed projecting fore part of the body, which remains unchangeably fixed, whilst the conical fore part (cephalothorax) of the male pupa breaks off upon the exclusion of the perfect insect."

Herr Schiödte, of Copenhagen, who was present as a visitor, made a few remarks in favour of the proposition that the Strepsiptera should be associated with the Coleoptera; observing that the characters of the latter Order are possessed generally by the Strepsiptera, though some are in a rudimentary state only, laying stress upon the form of the mouth and the metamorphosis, as more essential characters of the Coleoptera than the large prothorax; and arguing that in such a matter as the position of the Strepsiptera, the most essential characters of all the Orders, and not the minute detail, should be considered and compared: from which he was led to believe that the Strepsiptera, though apparently in some respects anomalous, were more nearly related to the Coleoptera than to any other Order; and that the opponents of this view should show that any of the characters of the Coleoptera are not represented in the Strepsiptera.

Mr. Waterhouse briefly opposed the junction of the Strepsiptera with the Coleoptera, confining himself chiefly to the different development of the prothorax in each Order, the form of which he considered very characteristic of different groups.

Mr. Westwood also made some similar observations: and argued that the Strepsiptera were more nearly allied to the coarctate Diptera.

September 5, 1853.

J. O. Westwood, Esq., Vice-president, in the chair.

The following donations were announced, and thanks ordered to be given to the donors: — The 'Zoologist' for September; by the Editor. The 'Literary Gazette' for

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August; by the Editor. The 'Athenæum' for August; by the Editor. The 'Journal of the Society of Arts,' for August; by the Society. 'Smithsonian Contributions to Knowledge,' Vol. V. Washington, 1853: 'Sixth Annual Report of the Board of Regents of the Smithsonian Institution:' Norton's 'Literary Register' for 1853: 'Portraits of North American Indians, with Sketches of Scenery, &c.'; all by the Smithsonian Institution. 'A Treatise on some of the Insects of New England which are injurious to Vegetation,' by Thaddeus William Harris, M.D. Second Edition. Boston, 1852; by the Author. 'On two new Species of Calanidæ, with Observations on the Spermatic Tubes of Pontella, Diapotamus, &c.,' by John Lubbock, Esq., F.Z.S.; by the Author. 'Bibliotheca Stephensiana; being a Catalogue of the Entomological Library of the late James Francis Stephens, Esq., F.L.S., which has been preserved entire, and is now removed to Mountsfield, Lewisham, where it may be consulted by any Entomologist every Wednesday evening, as heretofore.' One copy for the Library, bound, and fifty copies for distribution among the Members; by H. T. Stainton, Esq. 'Revue et Magasin de Zoologie,' Nos. 8—12, for 1852, and Nos. 1, 2, 4, 5 and 6, for 1853; by the Editor, M. Guérin-Méneville. 'Catalogue des Larves des Coléoptères connues jusqu'à ce jour, avec la Description de plusieurs Espèces nouvelles,' par M. F. Chapuis, Docteur en Médecine et en Sciences Naturelles, et M. E. Candèze, Docteur en Médecine. Liége, 1853; by the Authors. Three boxes of butterflies; by Thos. Jones Stevens, Esq., of Bogota, Corresp. M.E.S. Six specimens of Aglossa cuprealis, taken in an out-house belonging to a flour and oil mill in Cambridgeshire; by Mr. Bond.

Mr. Moore exhibited a box of Coleoptera and Lepidoptera, recently captured by him at New Brighton, Cheshire.

Mr. Weir exhibited Coleophora Inulæ? bred from Eupatorium Cannabinum, Coleophora Wockeella and its larva-case, found attached to a shoot of Genista tinctoria, and Gelechia lentiginosella, bred from Genista tinctoria, all from Pembury, Kent; also the larva of a Coleophora found feeding on a capsule of Silene inflata, and Tortrix dumetana from Lewes.

Mr. Edwin Shepherd exhibited Coleophora Vulnerariæ, Heliothis peltigera, Odontia dentalis, Pionea margaritalis, and two specimens of an albino variety of Eudorea pyralella, all from the neighbourhood of Dover.

Mr. Stevens exhibited a remarkable dark variety of Limenitis Sybilla from Essex, and a new British species of Simaethis from Arundel, captured in August.

Mr. Edleston sent for exhibition the head of a Plusia bractea, which he had separated from the moth in order to ascertain the nature of a singular body firmly attached to each eye, and which he had ascertained to be an anther of honeysuckle, from the flowers of which the moth is known to feed. These anthers were strongly affixed by their viscid extremities; and Mr. E. mentioned that he had seen several other examples on this species of moth.

Mr. Wing exhibited Ypsolophus Verbascellus, a new British species, bred from leaves of Verbascum floccosum, from Norwich, and Exæretia Allisella, beaten from Artemisia campestris near Lowestoft.

Mr. Douglas exhibited some Lepidopterous larvæ mining in leaves of Cornus sanguinea, from which, when full fed, they cut out an oval case in which to pass the winter. These larvæ, he said, were destitute of true legs, and had only indications of eight ventral and two anal prolegs. The species of moth produced from them is unknown. He likewise exhibited Gelechia Brizella, a species hitherto known as British

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only by a single specimen, and Coleophora binotapennella (*F. v. R.*), *Dup.*, both taken by him on the coast at Brighton in August, having been previously discovered there by Mr. Hemmings; the former among Statice Armeria, the latter among Chenopodium maritimum and Salicornia herbacea.

Mr. Stainton exhibited some larvæ of Gracillaria Phasianæpennella in the curious cases formed by them in the leaves of Polygonum Hydropiper, received from Professor Zeller, of Glogau. These cases closely resemble the truncated cones figured by Reaumur on leaves of sorrel, which figures are copied in Rennie's 'Insect Architecture.' He also exhibited larvæ of Cosmopteryx Zeiglerella, feeding on leaves of the hop, and larvæ of Elachista testaceella, feeding on leaves of Torilis Anthriscus, Sison Amomum, and other Umbelliferous plants, observing that the larvæ of E. Illigerella probably feed in a similar manner on the under side of the leaves of some of the Umbelliferæ.

Mr. Waring exhibited a specimen of Eudorea phæoleuca, recently captured by him in the Isle of Portland. This species is probably identical with E. Portlandica.

The Secretary read an extract of a letter from Dr. Candèze of Liége, stating that he was about to commence a Monograph of the Elateridæ, and wished to enter into correspondence with English entomologists, with a view to exchange specimens of Belgian and French species for those of England and other countries.

Read the following note on a letter from Mr. Weaver to Mr. Douglas: —

"Mr. Weaver writes from Loch Rannoch, September 1st, that he has this year taken several larvæ of the Lasiocampa described by Dr. Palmer in 1847, under the name of L. Callunæ (Zool. 1665); and that he is more than ever convinced that it is distinct from L. Quercûs. He has now noticed that these larvæ changed their last skin in June, and spun their cocoons to assume the pupa state, from the middle to the end of August: and they will not appear as perfect insects till next year. He has invariably found that this moth takes two years to go through its changes, whereas L. Quercûs is perfected in one year; and he looks upon this fact, coupled with the period of the last moult of the larva, as the strongest proof of its being a distinct species."

Read an extract of a letter addressed to Mr. Douglas by Mr. Edleston of Manchester, in which that gentleman offers specimens of Plusia bractea to any entomologist who may apply for them.

Read also the following extract of a letter to Mr. Douglas, from Mr. John Scott, of Renfrew: —

"Before receiving your letter I had been making inquiries respecting Gelechia cerealella, and find that two years ago a cargo of grain (barley) was laid in the granary from Alicante, in Spain, but that since this there had been British barley also deposited; it might happen that the moths were first reared from foreign grain, and have gone on accumulating ever since. I have now upwards of a hundred specimens set, and observe in one of my glasses today, a male and female *in copulâ*. It has as much right to be considered British as the beetle, Calandra granaria."

The quarterly part of the Society's 'Transactions' was on the table.

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October 3, 1853.

Edward Newman, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors: — The 'Zoologist' for October; by the Editor. The 'Athenæum' for September; by the Editor. The 'Literary Gazette' for September; by the Editor. The 'Journal of the Society of Arts' for September; by the Society. Hewitson's 'Exotic Butterflies,' part 8; by W. W. Saunders, Esq. 'Entomologische Zeitung,' June to September; by the Entomological Society of Stettin. 'Versuch die Europäischen Spanner von J. Lederer,' Wein, 1853, and 'Lepidoptera Microptera quæ J. A. Wahlberg in Caffrorum terra collegit, descripsit P. C. Zeller,' Stockholm, 1853; by Professor Zeller, Hon. M.E.S. 'Proceedings of the Berwickshire Naturalists' Club,' 1852; by the Club.

Dr. Lankester exhibited some of the "flies" recorded in the public papers to have appeared in vast numbers at Newcastle during the prevalence of the cholera in that town last month: and read the following extract from a letter written by a gentleman residing at Newcastle, respecting them: —

"They appeared some days before the cholera broke out with such virulence. For many days we had a dense heavy atmosphere, very depressing to the spirits; and the flies came in such swarms as only to be compared to the time when God filled the land of Egypt with a grievous swarm of flies. They appear to be only creatures of a day, those of yesterday die off and are replaced by others, and in the morning I find thousands of them dead."

On examination by the President, these "flies" were found to be Aphides, of two or three species,* which feed on a great variety of plants. These Aphides have no local connexion with Newcastle; but at this season of the year the usual migration of the winged females occurs, often in immense swarms. The hot, moist, stagnant atmosphere, observed to be concomitant with the appearance of cholera, would probably favour their development, and would certainly cause them to be more noticed; for such frail creatures could not move about in windy weather.

Mr. Saunders observed that vast numbers of Diptera were seen in India on hot, damp mornings, locally termed "cholera-weather:" and Mr. Baly added that in Warwickshire, in 1849, during the prevalence of the cholera, the people had noticed great swarms of flies called "cholera-flies." Of what kind they were he did not know; but neither in these, nor in the present appearance, could it be imagined there was any connexion between them and the disease.

Mr. Foxcroft sent for exhibition two boxes of his captures of insects of all Orders in Perthshire.

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* Mr. Walker has since pronounced them to be mostly Aphis Rumicis.

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Mr. Edwin Shepherd exhibited a hermaphrodite Alcis consortaria, in which the right side was female.

Mr. Smith exhibited specimens of many rare Hymenoptera, taken at Southend; and a living specimen of the male of the parasitic Anthophorabia retusa, now eleven days old, although it had been stated by Mr. Newport, that it did not live more than eighteen hours. Mr. S. stated that he should make a further communication respecting this insect at the next meeting.

Mr. Ingpen sent for exhibition leaves of Chrysanthemums, greatly infested with Dipterous mining larvæ, which first disfigured and eventually destroyed them; but never to such an extent as during the present season. These larvæ were a second brood, the former having ceased their devastations two months ago. They are probably the larvæ of Tephritis Onopordinis and Artemisiæ, on which there is an article by Mr. Westwood, in Loudon's 'Gardener's Magazine' for 1839.

Mr. W. W. Saunders exhibited specimens of a Xylocopa from Port Natal, with its nest, consisting of several chambers formed in a reed: also a mud nest of a species of Pelopæus, which contained five living pupæ when he received it, but they had all produced only parasitic Crypti.

Mr. S. Stevens exhibited a collection of insects, of several Orders, just received from Mr. Bates, collected in the region of the Amazon, including many small Coleoptera, most of which were probably new.

Mr. Hemmings sent for exhibition Asopia nemoralis, *Scop.*, taken June 26th, at Holm Bush, near Henfield, Sussex, and Choreutes vibrana, *Hub.*, taken September 11th, near Hurst, Sussex; both being new British species: also Phibalapteryx gemmaria, taken at Hurst, September 11th, and Coleophora binotapennella,—a fine specimen, showing the characteristic markings,—taken at Brighton in August.

Mr. Douglas exhibited specimens of Gelechia instabilella, bred from Chenopodium maritimum, gathered at Brighton in August.

The President read the following note by J. Walter Lea, Esq., communicated in a letter from A. R. Hogan, Esq.

"*Parasitic (?) Moth found in the Pupa of Lasiocampa Trifolii.* — In the course of the early summer of 1848, I found a caterpillar of Lasiocampa Trifolii in the vicinity of Oxford, which throve satisfactorily, and in due time entered the pupa state, having formed its cocoon in the regular compact oval form peculiar to it. Instead, however, of the imago appearing, as it should have done, in July or August, it continued in the pupa state the whole of the summer, autumn, and winter of that year, and also through the spring and summer of 1849. I then thought it must be dead, and opened the cocoon to ascertain the fact, when I found it not only alive, but quite lively, and apparently in perfect health. Having carefully closed the cocoon, I replaced it in the box where I was preserving it, and looked at it from time to time during the autumn and early winter of the same year, always finding it alive and lively, and very carefully closing the cocoon and box after each examination, so that no mischief should happen to it. In the beginning of 1850, the pupa ceased to show signs of life when examined and handled, but not knowing what to make of it, I took redoubled care of it, and kept it by me all through the summer and autumn of the year; but towards Christmas, being persuaded that it must be really dead, I at last resolved to open it, which I did; and the first thing that I saw on making an opening in the puparium, was the head and eyes of a small moth, moving about rapidly, and in the most lively

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manner. A few moments sufficed to exhume the little creature, which was about the size and had very much the general appearance of Margaritia hyalinalis. It was very lively, and walked quickly about the table, moving its antennæ in all directions. The wings were all shrivelled and crumpled together, so that I could make but very little of them, nor did they in the least expand with exercise. The inside of the puparium of the Lasiocampa Trifolii was filled with a dry pale powder, and I could find no trace of any cocoon, or vestige of any kind, of the moth which I had just extracted from it. There was no evidence to show how long it had been there; and as it was manifestly far too small and feeble to make any opening in its prison by its own efforts, it must have remained there until it died, had I not opportunely set it free. It did not occupy more than one-sixth of the interior of the puparium, and lay in a reversed position, with the apex of the abdomen in the place of the head of the proper occupant. It was quite unable to turn itself round inside the case, as it was too long, and also the whole space which it did not fill, was well filled with the dry powder above mentioned. A rigid examination showed no opening in the puparium through which anything could have entered; and indeed the pupa had been too carefully preserved to be within the reach of accident or enemies. Most unfortunately, before I had completed my investigations, I was suddenly called away, and in my absence the whole was swept away and destroyed by a servant. I took no memorandum of it at the time, being exceedingly busy, but I have the clearest recollection of the circumstances, and can answer for the facts being in every particular correct. I cannot explain the matter, and should be very glad of any light that can be thrown upon it. — *J. Walter Lea; Ramsgate, September 7*, 1853."

The President called the attention of the Society to three different subjects, as under; requesting observations from the members present.

1. *Bees destroyed by Toads.*—"A friend has lately communicated to me a fact relative to bees, which, having mentioned to my highly esteemed and venerable friend, Dr. Bevan, and having been recommended by that distinguished apiarian to make it public, I beg to submit to the Society. My friend relates, that a stock of bees was observed to grow weaker day by day, until at last it became so pauperized that the hive was removed, and the bees turned adrift to shift for themselves: nothing amiss was detected in the interior of the hive. A second stock shortly afterwards exhibited similar symptoms of depopulation; and a suspicion was entertained that some nocturnal depredator entered the hive at night and devoured the bees. About two hours after dark, the hive was visited with a view to an inspection of the interior; but on arriving at the spot with a lantern, the owner found a large toad squatted on the alighting-board, and looking about him with bright and animated eyes. Presently, a night-roving bee returned home; there was a sudden movement on the part of the toad, and the bee vanished. A long interval of patient watching ensued, when a second bee came home, a similar movement of the toad followed, and the bee again vanished: but the light of the lantern being this time thrown full upon him, he was distinctly observed to swallow. The toad was caught and killed, and eight still living bees were taken from his stomach. I attempt no explanation of the mode in which the toad attained his station at the entrance of the hive, or what antidote he possessed against the poison so likely to be conveyed by the stings of the bees; all I can do is to vouch for the veracity of my informant, which I do without any hesitation."

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Mr. Weir, in reply to an observation made as to the difficulty of a toad's climbing, stated that he knew an instance in which a toad had climbed up an open door, and seated himself on the top.

2. *Oniscus Armadillo.* — "Finding this milleped extremely injurious to ferns and Lycopodiums, I have paid some little attention to its habits, with a view to arresting its increase. In pursuing this object, I have made a few observations that appear to me of some interest. *In the first place*, the female is strictly viviparous, and the young are perfectly developed while still in the ovary of the female: they are from sixteen to twenty-two in number, and after birth attach themselves to the legs of their parent, and are carried about by her. I found them first in this position; afterwards I observed the female in the act of parturition; and, lastly, I killed several females which appeared gravid, and found the young apparently ready for extrusion.* *In the second place* I find that the young, although possessing perfectly developed organs of locomotion, manducation, &c., have not the configuration of the adult: the second segment (? cephalothorax) being proportionately larger, and bearing the eyes, which are situated near its exterior margin. *Thirdly*, the similarity of these minute millepeds to the extinct trilobites, particularly to the genus Asaphus, is most striking, especially in the figure of the enlarged second segment, and the position of the eyes, which are elongate, linear, very distant, and have a reflexed external margin. The difference between the infant and adult Oniscus Armadillo, and the similarity of the infant O. Armadillo to a trilobite, would almost induce the conclusion that the trilobites were a lower form of Isopod Crustacea, rather than allies of Limulus and cognate genera. This similarity to a trilobite, is equally apparent whether the milleped be extended or rolled into a ball."

3. *Typhlocyba Filicum.* — "I beg to exhibit, under the provisional name of Typhlocyba Filicum, a minute Hemipterous insect, which a good deal resembles the Typhlocyba Ulmi of Germar, Walker, and other entomologists, but which seems to me to be specifically distinct. The anterior wings are bright yellow to rather below the middle, the apical portion transparent, irrorated with black; the head is yellow-green, with prominent black eyes; the prothorax is also yellow-green; the scutellum is an equilateral triangle, and yellowish green; the abdomen is intensely black, with the extreme margin of each segment yellow, thus giving it a distinctly annulated appearance. My object in desiring to attract the attention of the Society to this little creature, is to point out the excessive injury which it commits in ferneries. To ferns in a wild state it is highly injurious, often changing their delicate green colour to a sickly yellow or whitey-brown; but its introduction into a glazed house in which ferns are cultivated, is quite fatal to the beauty of their appearance. It inserts its short, strong, and acute rostrum into the parenchyma of the frond, and remains for days in one position, apparently engaged during the whole time in extracting the sap, after the manner of an Aphis. The result of this abstraction of the juices of the plant is not, as in the case of the Aphis, a distortion of the leaf, but the production of whitish or yellowish spots or blotches, which increase in number and size until the entire frond is permanently although not uniformly discoloured. The injury is committed by the

* Some of these were exhibited.

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insect in all its stages; but as its growth to maturity is extremely rapid, and as its life in the imago state is usually prolonged, it follows that the injury caused by the insect in its perfect, is much greater than that in its preparatory states. It is worthy of remark, that all the species of ferns are not equally obnoxious to its attacks; for of our English ferns, Osmunda regalis and Asplenium lanceolatum are rarely touched; Lastrea Filix-mas, L. spinosa, L. uliginosa, L. multiflora and L. rigida are greatly injured; and Asplenium Adiantum-nigrum and Polypodium vulgare are sometimes absolutely killed. When disturbed, the insect leaps off the frond after the usual manner of the Cercopidæ; but when once committed to the air, it flies about, and even hovers, with all the facility of a Musca. The smoke of tobacco, if the greenhouse can be sufficiently closed, is fatal; but there is a great deal of difficulty in applying it effectually in a large or imperfectly closed house. The nuisance may also be in some degree abated, by burning the fronds in autumn, and thus, in all probability, destroying the eggs."

Read, a "Description of a new Species of Lithocolletis,—L. irradiella." By John Scott, Esq. It is very like L. lautella, but the anterior wings are darker, the streaks more slender, and the spot at the anal angle not on the inner margin. The specimen from which the description was made, was taken in July, in a damp wood near Renfrew, and was exhibited to the meeting.

Read the following extracts from a letter to the Secretary, by the Rev. Joseph Greene, of Wendover: —

"No genus of moths that I am acquainted with is so subject to Ichneumons as Notodonta. Of N. camelina, I should say seven in every ten are pierced. I found five of N. trepida this year, four were pierced; and the same with N. zic-zac, which is common here in the larva state. N. dictæa and dictæoides are apparently more fortunate."

"The singular epidemic of muscardine? exists to a great extent among larvæ this year, arising, I imagine, from the extreme dampness of the season. The characteristics of the disease are, that when the larva is fully grown, it suddenly, and without the slightest apparent premonitory symptom, becomes stiff and rigid, with the fore part of the body extended, and in a short time dries up. I have found it in zic-zac, Coryli, antiqua, angularia, &c. My house being unfortunately very damp, I should not have thought much of this circumstance, but it has, I believe, been noticed by others."

The President drew the attention of the Meeting to the Rev. J. F. Dawson's prospectus of his 'Monograph of the British Geodephaga,' recommending the proposed work as worthy of their support, and stating that unless a sufficient number of subscribers was obtained, it would not appear.

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November 7, 1853.

J. O. Westwood, Esq., Vice-president, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for November; by the Editor. The 'Literary Gazette' for October; by the Editor. The 'Athenæum' for October; by the Editor. The 'Journal of the Society of Arts' for October; by the Society. 'Revue et Magasin de Zoologie,' Nos. 7 and 8, 1853; by the Editor, M. Guérin-Méneville. A lithographic portrait of the late Dr. W. A. Bromfield, framed and glazed; by his sister, Miss Bromfield. Lists of the British Tineidæ, for marking the desiderata to the Society's Collection; by E. C. Buxton, Esq. A box of South American Lepidoptera, in the finest condition, and containing several new species; by Thomas Jones Stevens, Esq., of Bogota, Corr. M.E.S. A box of British Lepidoptera, including a hermaphrodite Smerinthus Populi; by the Rev. Joseph Greene. Six specimens of Plutella Dalella; by the Rev. J. Johnson.

Monsieur Henri Jekel, of Paris, was balloted for and elected an Ordinary Foreign Member of the Society.

Mr. Curtis exhibited a box of rare Coleoptera from Mozambique, received from Signor Bertoloni, of Bologna, including a specimen of Goliathus Derbyanus.

Mr. Edwin Shepherd exhibited a new British moth, Noctua Sobrina, *H.-Schæf.*, and an apparently new species of Peronea; both taken this season in Perthshire by Mr. Weaver.

Mr. S. Stevens exhibited another specimen of Noctua Sobrina, and a remarkable variety of Trichius fasciatus, in which the dark markings of the elytra were run together into a blotch; both taken by Mr. Weaver, in Scotland. He also exhibited a box of Diurnal Lepidoptera, in the finest condition, captured in Nicaragua, and forwarded in paper envelopes, the wings being closed over the body. In this state they were packed into a small space, and travelled free from injury, requiring only to be relaxed and set.

Mr. Shield sent for exhibition a specimen of Depressaria subpropinquella, bred from a larva found feeding on a thistle; and a new Nepticula, of which the larva makes a peculiar centrifugal mine in the leaves of Rumex Acetosa, and hitherto found only near Dublin. Mr. Stainton intends to describe the species under the name of N. Acetosæ.

Mr. F. Smith exhibited living specimens of a South American ant, Odontomachus unispinosus, imported with some Orchidaceous plants, and given to him by Mr. Stevens.

Mr. Douglas exhibited leaves of Glechoma hederacea, bearing tubular galls on the upper side, formed and tenanted by larvæ of Cecidomyia bursaria, *Bremi*. These insects he had been able to identify by means of the Monograph on Cecidomyia, just published by Herr Winnertz, in the 8th volume of the 'Linnea Entomologica.' Mr. D. also exhibited a living larva of a Talæporia? from a fence near Croydon; and leaves of sallow in which were the mines of Lepidopterous larvæ (Nepticula) and of Dipterous larvæ (Phytomyza), almost identical in appearance.

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Mr. Boyd exhibited Triphæna subsequa, Limacodes asellus, Macaria notata, Prodelia literalis, and varieties of Satyrus Janira and Argynnis Paphia, all captured in the New Forest.

Mr. Curtis exhibited parasitic insects taken from Malachius æneus, Epipone spinipes, Andrœna Gwynana, Athalia lineolata, Bombus pratorum, and an Ammophila from Africa.

Mr. John Clifford, of Pimlico, sent a sample of pearl barley, destroyed by insects, which were now identified as Anobium paniceum and Ptinus ovatus. The Chairman remarked that the former of these insects had several times been reported to the Society as injurious to farinaceous substances.

Mr. T. Desvignes exhibited specimens of a new Ichneumon, reared from larvæ of Nonagria Typhæ and N. paludicola; and read a description of the species under the name of I. paludator.

Mr. Baly communicated "The Characters of Paralina, a new Genus of Chrysomelidæ," of which the type is Chrysomela Indica, *Hope*.

Mr.. Westwood exhibited his original sketch of a moth taken at Ballymena, in Ireland, by Mr. Templeton, and mentioned in Westwood and Humphreys' 'British Moths,' (vol. ii. p. 67). Mr. Stephens had inserted the species in the Museum Catalogue under the name of Dasydia torvaria; but Mr. Westwood was now of opinion, from reference to Duponchel's figure and description, that it was Cleogene Peletieraria. Mr. Westwood also exhibited some larvæ in a bottle, which, from the locality of their capture on the coast, near Dublin, he thought might be those of Diglossa mersa.

Mr. Smith exhibited the same male Anthophorabia he brought to the last meeting, still alive; also larvæ of Anthophora retusa, covered with larvæ of Anthophorabia and Monodontomerus, the former apparently parasitical on the latter,—a parasite upon a parasite: and he read a series of observations on the structure and œconomy of Anthophorabia. The chairman referred to the unprecedented circumstance of an insect without reticulated eyes possessing ocelli, as Mr. Smith was positive is the case in this instance; and Mr. Newman noticed, as most rare among insects, the fact reported of the male pairing consecutively with several females, and still surviving. Mr. Waterhouse, Mr. Curtis, and Mr. Hudson also made some remarks on the subject.

Mr. Wallace read the commencement of a paper "On the habits of the Butterflies of the Amazonian Valley," which will be resumed at the next meeting.

December 5, 1853.

Edward Newman, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for December; by the Editor. The 'Athenæum' for November; by the Editor. The 'Literary Gazette' for November; by the Editor. The 'Journal of the Society of Arts' for November; by the Society. The 'Philosophical

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Transactions of the Royal Society,' 1863, parts 1 and 2; by the Society. 'On two new Species of Calanidæ, with Observations on the Spermatic Tubes of Pontella and Diapotmus, &c.': by John Lubbock, Esq., F.Z.S.; by the Author. 'On the Destructive Powers of Scolytus destructor and Cossus ligniperda': by Captain C. J. Cox; by the Author. A specimen of Plusia bractea; by R. S. Edleston, Esq. Two specimens of a Sciaphila, greatly resembling S. Penziana, from Scotland; by John Scott, Esq., of Renfrew. An extract of a letter from Mr. Henry Doubleday, announced that if this Sciaphila, upon further examination, were proved to be a distinct species, he intended to describe it.

R. G. Schofield, Esq., Glen Mohr Villa, Greenwich, and W. Groves, Esq., 12, Morden Place, Lewisham Road, were balloted for, and elected Subscribers to the Society.

The Secretary announced that the Council had determined to distribute the Society's duplicate specimens of British Lepidoptera among the Members.

Mr. Westwood exhibited a piece of honey-comb sent to him by a correspondent, in which the queen had laid drone-eggs in worker-cells, which had been enlarged for this purpose.

Mr. Curtis exhibited some Hymenoptera and Diptera he had received from M. Léon Dufour and Signor Passerini, most of them valuable as typical specimens of species described in the 'Annales de la Société Entomologique de France.' In the box also was Tryphon nigriceps, *Grav.*, a species new to this country. It was bred by Mr. Foxcroft from cocoons of Trichiosoma lucorum, which he found in Wales. Mr. Curtis remarked that in 1828 he had bred Tryphon rufus from the cocoon of his Trichiosoma pratense, the larvæ of which he found in a damp meadow near Ambleside, in the previous year, on a plant he did not remember, it certainly was not whitethorn, but he thought a Spiræa or some herbaceous plant. The Tryphon rufulus of Stephens is the male of T. rufus. These species, from the form of the petiole, belong decidedly to the genus Mesoleptus, which Gravenhorst hints at in his work; but the multitude of exceptions to the characters of the genera proposed in the systematic tables, show how imperfect the latter are, and how difficult it is to study the Ichneumonidæ.

Mr. Stevens exhibited two specimens of the very rare British longicorn beetle, Pogonocherus fasciculatus, taken by Mr. Foxcroft, in the Black Forest, Perthshire, and the new Noctiluca from Scotland, but being a female, he had not been able to determine the species with certainty.

Mr. Douglas exhibited specimens of the scarce moth, Hyponomeuta irrorellus, reared by Mr. W. Kirby, of Wandsworth, from larvæ found feeding upon Euonymus Europæus; and Mr. Stainton exhibited some of the cocoons.

Mr. Wallace exhibited a fine new longicorn beetle, Acanthocinus sp.? from California, and a splendid butterfly, Zeonia Octavius, *Fab.*, from Pará.

Captain C. J. Cox laid upon the table a block of wood perforated by larvæ of Cossus ligniperda, and pieces of the wood and bark of elm and ash, illustrating the different ways of mining pursued by the larvæ of Scolytus destructor and Hylesinus Fraxini. For several years he had devoted his attention to these insects, especially the Scolyti, and he was convinced that their ravages were so extensive as to be of great importance. Some of the oldest and finest elms in the parks had been destroyed, and young sound trees were not exempt from their attacks. In opposition to several distinguished entomologists, he was convinced that Scolytus destructor attacked sound trees and caused them to become diseased, partly through the influence of a poison

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contained in the excrement of the insect; and a course of experiments had not only assured him on this point, but had also enabled him to state to the Office of Woods and Forests that the damaged trees might be saved and the pest prevented from spreading, if they would adopt his plan of partially barking the trees in the places attacked, and removing and destroying the portions cut off. Once when in a ship-timber yard, where he had a yacht building, he saw an ash-tree so covered with these insects, that he calculated there were not less than 280,000 of Hylesinus Fraxini in it; the Scolytus was certainly quite as prolific, and unless some such steps as he had pointed out were speedily adopted to check the evil, he would venture to say that in sixty or seventy years there would not be an elm-tree in or about London. The damage caused by Cossus ligniperda was very great, and he also attributed a poisonous quality to the excrement of the larvæ; but he found that if the larvæ were followed up and cut out, the trees soon recovered. He said that in the Royal Botanic Society's Gardens, Regent's Park, out of two hundred and forty trees, only ninety had escaped being attacked, and out of eighteen operated upon, all had done well except one.

Mr. Westwood said his late lamented friend, Audouin, who had paid great attention to this subject, had once when he was visiting Paris, pointed out to him that a female Scolytus first attacked a tree for food, and then other females followed to lay their eggs on the perforated and exposed place.

Mr. Edward Sheppard said that he had found the insects alive in old elm rails.

Mr. Curtis had never known young trees attacked; but at St. John's Wood his attention had been called to some old elms, which had completely lost their bark from the attacks of Scolytus; and he thought that only trees in an unhealthy state, which frequently happened from many causes, or old trees decaying, became the prey of this beetle.

Captain Cox replied to these objections:— 1. That he was sure, from observation, that the females laid their eggs on sound trees, to which they went for that purpose. 2. That he had known the insects eat down into the solid wood, but only when they had deprived the bark and alburnum of their nutriment. And, 3. That the majority of the trees in the Regent's Park were growing vigorously, even to the terminal shoots, when attacked. He added that the efficacy of the plan he recommended as a cure, was proved by the fact, that trees rapidly in process of destruction by Scolytus and Cossus had, after the operation, become quite healthy.

The President, in concluding the discussion, said that the Society was greatly indebted to Captain Cox for his lucid explanations on a subject of such great importance and general interest. Without wishing in the slightest degree to undervalue those exhibitions of rarities, or those descriptions of genera and species which formed the staple of the Society's proceedings, he considered that carefully prepared observations on the habits of insects possessed a still higher value and interest, more especially when such habits exercised an important economical influence, whether beneficial or injurious. He also wished to observe, that in discussions like that which had just taken place, and to which he had listened throughout with the utmost attention and pleasure, it would be a great advantage if a month's notice could be given, in order that members might have the opportunity of refreshing their memories by referring to what had been previously written on the subject, in fact, of "reading up," so to speak, for the occasion, for we really came as it were unprepared, and treated almost as new, a subject to which our best entomologists had already given their earnest attention. With regard to the opinions advanced and ably advocated by Captain Cox, he

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inclined to offer two remarks. First, in reference to the Scolytus attacking young and sound trees, he thought the Captain's views were fully borne out by the sound and healthy wood of a young tree which was exhibited, and in which the ravages of the insect had been closely watched from their very commencement until they caused the death of the trees: this view was also in accordance with his (the President's) own observations on the trees in Camberwell Grove, where he had for years watched the progress of the pest, and found it extended indifferently to old and young, sound and unsound trees. The other remark he wished to make was, that he dissented from Captain Cox's opinion, that any poison was diffused by the insects, either in the case of the Cossus or Scolytus; he attributed the injury to simple mechanical causes, since the galleries or perforations of these insect-pests either arrested the flow of sap altogether, or diverted it from its ordinary channels; the admission thus given to rain-water, and also to other insects, likewise tended to accelerate decay.

Mr. Smith exhibited two wasps' nests, one formed in a bee-hive and the other in a cask; and he also exhibited a cell of Anthophora retusa, containing a larva of the bee and several females of its parasite Anthophorabia: and stated that the duration of the life of the *males* he had observed was seven weeks. Since the last meeting of the Society, Mr. Walker had informed him that he had described the Anthophorabia retusa of Newport, as far back as 1839, in his Monograph of the family, under the name of *Cirrospilus Acasta*.

Mr. Westwood, referring to his remarks upon Anthophorabia at the last meeting, said that Mr. Smith having afforded him an opportunity of viewing the insect under a high magnifying power, he was convinced that Mr. Smith was correct in saying it possessed true ocelli.

Mr. Wallace read the concluding portion of his "Notes on the Habits of the Butterflies of the Amazonian Valley."

Mr. Westwood, in reference to a remark in Mr. Wallace's paper, that a certain species of Hesperia, with a very beautiful under surface, sat with its wings erect, observed that Nature generally provided that adornments of this kind should be exhibited; it was particularly the case with the Catocalidæ, which, having very beautiful under wings, rested with the upper wings open, so that the under wings were exposed.

Mr. Curtis differed from Mr. Westwood; he thought that in the genus Catocala, especially in C. nupta, this was not the case.

January 2, 1854.

Edward Newman, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for January; by the Editor. The 'Athenæum' for December; by the Editor. The 'Literary Gazette' for December; by the Editor. The 'Journal of the Society of Arts,' for December; by the Society. Hewitson's 'Exotic Butterflies,'

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Part 9; by W. W. Saunders, Esq. 'Verhandlungen des zoologisch-botanisch Vereins in Wein,' 1 Band. Wein, 1852; by the Society. 'Entomologische Zeitung,' October to December, 1853, and for 1853, complete. 'Linnea Entomologica,' viii. Band. Berlin. 1853. 'Beitrage zur nähern Kenntniss von Periplaneta (Blatta) orientalis, *Linné*;' von C. Cornelius: Elberfeld; all by the Entomological Society of Stettin. 'Report of the Council of the Art Union of London for 1853,' and 'Almanac for 1854;' by the Art Union. Two pairs of Lælia cœnosa; by Mr. Foxcroft. Fifty specimens of butterflies; by T. J. Stevens, Esq., Bogotà, Corr. M. E. S. A box of British Micro-Lepidoptera; by P. H. Vaughan, Esq.

It was announced that Mr. Thomas Whitfield, well known as a zoological collector in Africa, and whose exertions, during thirty years, added many rare animals to the collection of the late Earl of Derby, the British Museum, &c., died in London, on the 25th of December last.

Miss S. Thompson, Barn Hill, near Stamford, was elected a Subscriber to the Society.

Mr. S. Stevens exhibited some butterflies received by him from Mr. T. J. Stevens, of Bogotà, among them a couple of the rare and beautiful Morpho Ganymede, *Westwood*, (M. Sulskowskii, *Kollar*). One of them being quite spoiled by grease when it arrived, was immersed for twenty-four hours in camphine, and then magnesia having been applied, it was restored to its original brilliancy, so that no one could tell which of the two had been greasy. He also exhibited a few butterflies from Manilla, whence very few are obtained in this country.

Mr. Westwood handed the following extract from the 'Gardener's Chronicle,' to which journal it was communicated by Mr. R. Fortune:—

"I am staying at present (August 16th) in a Buddhist temple, situated in a most romantic and beautiful spot amongst the tea-hills in the province of Chekiang. Some of the priests in this temple are fond of bees, or it may be they are fonder of the honey, and keep a number of hives. The Chinese hive is a very rude affair, and a very different looking thing from those we are accustomed to use in England, and yet I suspect were the bees consulted in the matter they would prefer the Chinese one to ours. It consists of a rough box, sometimes square and sometimes cylindrical, with a movable top and bottom. When the bees are put into a hive of this description it is rarely placed on or near the ground, as with us, but is raised eight or ten feet, and generally fixed under the projecting roof of a house or outbuilding. No doubt the Chinese have remarked the partiality which the insects have for places of this kind when they choose quarters for themselves, and have taken a lesson from this circumstance. My landlord, who has a number of hives, having determined one day to take some honey from two of them, a half-witted priest who is famous for his prowess in such matters was sent for to perform the operation. This man, in addition to his priestly duties, has the charge of the buffaloes which are kept on the farm attached to the temple. He came round in high glee, evidently considering his qualification of no ordinary kind for the operation he was about to perform. Curious to witness his method of proceeding with the business, I left some work with which I was busy, and followed him and the other priests and servants of the establishment to the place where the hives were fixed. The form of the hives, in this instance, was cylindrical, each was about three feet in height, and rather wider at the bottom than the top. When we reached the spot where the hives were placed, our

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operator jumped upon a table placed there for the purpose, and gently lifted down one of the hives and placed it on its side on the table. He then took the movable top off, and the honeycomb, with which the hive was quite full, was exposed to our view. In the meantime an old priest having brought a large basin, and everything being ready, our friend commenced to cut out the honey-comb with a knife made apparently for the purpose, and having the handle almost at right angles with the blade. Having taken out about one-third of the contents of the hive, the top was put on again, and the hive elevated to its former position. The same operation was repeated with the second hive, and in a manner quite as satisfactory. But it may be asked, 'Where were the bees all this time?'—and this is the most curious part of my story. They had not been killed by the fumes of brimstone, for it is contrary to the doctrines of the Buddhist creed to take away animal life—nor had they been stupefied with a fungus, which is sometimes done at home, but they were flying about above our heads in great numbers, and yet, although we were not protected in the slightest degree, not one of us was stung; and this was the more remarkable, as the bodies of the operator and servants were completely naked from the middle upwards. The charm was a simple one:—it lay in a few dry stems and leaves of a species of Artemisia which grows wild on these hills, and which is largely used to drive that pest the mosquito out of the dwellings of the people. This plant is cut early in summer, sun-dried, then twisted into bands, and it is ready for use. At the commencement of the operation I am describing, one end of the substance was ignited and kept burning slowly as the work went on. The poor bees did not seem to know what to make of it. They were perfectly good-tempered and kept hovering about our heads, but apparently quite incapable of doing us the slightest injury. When the hives were properly fixed in their places, the charm was put out, and my host and his servants carried off the honey in triumph. 'Come,' said he to the operator and us who were lookers on, 'come and drink wine.' 'Aye,' said the half-witted priest, 'drink wine, drink wine;' so we all adjourned to the refectory, where wine in small cups was set before us."

Mr. Curtis suggested that it might be worth trying if any of our English species of Artemisia would have the same effect as the Chinese.

Mr. Westwood said that a neighbour of his had turned up his hives and taken out the honey he required, smoking a cigar during the operation, without suffering any injury from the bees; but he himself had deprived hives of their honey with perfect safety, simply by drumming the bees into an empty hive, without any smoking.

Mr. Curtis communicated the following note on Panurgus ursinus:—

"I wish to record the habits of this bee, which I observed during a visit to Tunbridge Wells.

"On the 13th of July I saw considerable numbers flying over a foot-path by the side of a heath, many of them were burrowing in the earth, and others were paired over the holes they had formed. On the 24th I again visited the same locality, when I found the females curling themselves up in the flowers of a Hieracium? the males flying around them. At the same time scores of the males were entering the holes in the foot-path, and occasionally I saw at the entrance a male rolling over with a female in the dust, in the act, I suppose, of copulation. In 1826, when I illustrated this genus in the 'British Entomology,' the species were considered rare; I had, however, found P. ursinus not uncommon on Shooter's Hill, in August, 1819; and P. lobatus I

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detected in abundance at Black Gang Chine, Wallpan Chine, and Ventnor, in the flowers of a hawk-weed, from the end of July to the middle of August, 1826; and Mr. Smith also has lately found it in the Isle of Wight.

"I regret that I could not, from the hardness of the foot-path and for want of a proper instrument, investigate the burrows, apparently formed by these bees, and I am quite unacquainted with their metamorphoses."

The Secretary read the following extract from a letter addressed to him by Mr. T. J. Stevens of Bogotà: — "Respecting small Lepidoptera, there are a great many in this hot country, at least nocturnal ones, for as soon as the candles are lighted they enter into the houses; but in most parts the mosquitoes enter at the same time, and it would require a thorough-bred entomologist to collect moths under their auspices."

The following papers were read: — "Descriptions of some new Species of Butterflies from South America;" by W. C. Hewitson, Esq. The first part of a "Monograph of the Chrysomelidæ of Australia;" by J. S. Baly, Esq. "Some Observations on the Excrement of Insects, in a letter addressed to William Spence, Esq., F.R.S., &c.;" by John Davy, M.D., F.R.S., Inspector-General of Army Hospitals. In this paper the author records the result of many investigations into the chemical constituents of the excrement of insects of several Orders, both in the larva and adult states, remarking upon the importance of the subject with reference to the vast number and diffusion of insects, and the effect their excrement, consisting as it does of matter most powerfully stimulant to vegetable life, must have in the economy of Nature.

A new part of the 'Transactions' was announced as ready for distribution.

Anniversary Meeting, January 23, 1854.

EDWARD NEWMAN, Esq., President, in the chair.

The Secretary read the Bye Law pertaining to the Annual General Meeting, and the Report of the Library and Cabinet Committee, made to and and adopted by the Council. Read also an abstract of the Treasurer's Accounts, from which it appeared that the finances of the Society had quite recovered from their depressed state at the end of 1852, and that the income and expenditure were now about equal.

The President having appointed two Scrutineers, the ballot took place; when it appeared that Messrs. W. S. Dallas, Edward Sheppard, F. Smith, and H. T. Stainton were elected into the Council, in the room of Messrs. J. Curtis, E. W. Janson, W. Spence, and J. O. Westwood; and that the following gentlemen were re-elected to the respective offices for the ensuing year: — Edward Newman, Esq., President; S. Stevens, Esq., Treasurer; and J. W. Douglas and W. Wing, Secretaries.

The President then delivered the following Address: for this, and his services to the Society during the year, the Meeting passed a vote of thanks, and he was requested to allow his Address to be printed.

Votes of thanks were also passed to the Treasurer, Secretaries, and retiring Members of the Council.

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THE PRESIDENT'S ADDRESS.

GENTLEMEN,

In returning into your hands the important office with which you have intrusted me, I should neither be performing my duty, nor obeying the dictates of my own inclination, were I not to express to you my sincere gratitude for the kindness with which you have invariably received me. I came amongst you a comparative stranger to all, an entire stranger to the majority: not only, as I conceived, by no claim or merit of my own, but quite in opposition to my own often-expressed, and still unaltered judgment, that the office-bearers of every Society should be selected from among its most active and useful members. Notwithstanding these sentiments I came forward at your call, have been received by you with the utmost kindness and indulgence, and shall ever remember with pleasure the period during which I have enjoyed the honour of presiding over you.

The duties of President, and indeed the general business of the Society, are so new to me, that I cannot help fearing that some of my observations thereon may appear unimportant, or out of place; but I still trust to your indulgence, and, as every fresh actor is found to give some new reading to a part, however variously it has been played before, so it is probable that each successive President may be struck by some point or other which his predecessors had either designedly or unintentionally overlooked. You will, I am sure, bear with me while I briefly allude to one or two subjects which have particularly attracted my attention.

The first of these is the peculiarly, although not exclusively, *British* character of our proceedings. Our science is truly cosmopolitan: but it is the honour and glory of a naturalist to make himself thoroughly acquainted with the productions of his own country. How immutably true, and how profoundly patriotic, is the Linnean axiom, "Turpe est in patriâ vivere et patriam ignorare." Let us begin at

make ourselves thoroughly acquainted with the Natural

eat Britain: and, that end achieved, we may enlarge the

ry by degrees. Let us not grasp too much at the outset.

servation applies generally as well as geographically;

fo. our research to a class, an order, or a family, we are

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enabled to give it more intense attention. What an intimate knowledge have Zeller, Stainton, our worthy Secretary, and others thus acquired of the Micro-Lepidoptera; Mr. Dawson of the British Geodephaga; Mr. Doubleday and Mr. Edwin Shepherd of British Lepidoptera; Mr. Walton of British Curculionidæ; Schönherr of Curculionidæ generally; Chevrolat of Cerambycidæ; Pictet of Phryganidæ; Gravenhorst of Ichneumonidæ; Mr. Smith of Aculeate Hymenoptera, and especially of our British bees; Meigen and Walker of Diptera! I might cite fifty examples equally striking, and all equally establishing the fact that the more restricted the range of inquiry, the more certain, precise, and durable will be its results. The debilitating effect of desultory study is obvious to every psychologist. It is with mind as with matter, the more extensive the surface it covers the more attenuated will be the covering. Study, in order to be productive of useful results, must be concentrated and systematised: it then shines brightly forth on the path of the future student.

The communications which have struck me as possessing the most absorbing interest are such as relate to insects which exert an important influence over man, whether for his benefit or injury: such, for instance, as that by Mr. Hanbury, on the wax insects of China; that by Mr. Oswell, on the cattle fly of Africa; and that by Captain Cox, on Scolytus: in these instances man is brought into absolute contact with the insect: in the first this contact is entirely beneficial; in the others entirely the reverse: and mankind would be infinitely indebted to the entomologist who should, by attentive observation, detect the means of increasing the benefit or of mitigating the injury. To the discussions which have resulted from these and other communications, I have always listened with the deepest interest and most profound attention; and I have been peculiarly gratified to observe the uniformly courteous manner in which they have been conducted. There is scarcely one scientific subject which we can all view in the same light, and the difference of opinion, which of necessity results from the different mental constitution of individuals, is in itself an important element in our search after that truth which is the kernel of the whole question, the reward we obtain for our labour in clearing away the tasteless and seemingly impenetrable husk with which we so often find it invested. Nevertheless, this difference should ever be urged, as it has been, with that courtesy and that respect for the feelings and the judgment of others, which dignifies alike the original opinion and the objection, and which evinces a love of truth overcoming a love of conquest. I could wish that a month's notice

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were given of any paper likely to excite such discussions: the most prosperous of all our Societies, the Royal Geographical, adopts this course; and I have actually read this day in the 'Morning Herald' an advertisement of the papers next to be discussed: by this expedient we should escape both objections and adhesions carelessly and hastily given, and out of our abundant printed "treasures, things new and old might be brought forth," and thus much additional information diffused among our members: it has several times struck me as somewhat inconsistent for any scientific body to discuss, as new, matters which have long since been carefully investigated by our predecessors. But these remarks do not, in any degree, apply to the mere introduction of papers: gladly would I see the greatest possible encouragement given to such introduction; and no one could object to being referred, with courtesy, to sources whence he might derive more perfect information.

On one subject I venture to express an opinion at variance with what appears a prescriptive practice. I repeatedly find in entomological works the indication of a desire to depreciate that particular branch of the science which some one else has taken, or is supposed to be taking up. Such terms as "species-man," "mere collector," "theorist," and many others, need but be quoted in explanation of my meaning. Now the sentiment implied by such expressions is unphilosophical; it is not in accordance with the catholicity of science; it implies that we are drawing a comparison between ourselves and others disadvantageous to those others, and it therefore has a direct tendency to foster, if not to create, feelings that ought not to exist. The Lepidopterist, the Dipterist, the Hymenopterist, or Coleopterist; the systematist or the utilitarian; the student of economy, or the collector; the man, in fact, who selects, of his free choice, his own particular, favourite objects of study, and yet who presumes to look down on another who has made a different choice, exhibits a want of that philosophical spirit which would assure him that all these work together harmoniously for the general good: all are equally striving after the *excelsior* of the poet: each is ascending, after his own fashion, the hill of science: and not only must he have perfect liberty to select his own path, but, if he be only industrious, he will establish an indubitable claim to the merit of strewing that path with flowers which any of us may gather. One man studies an insect solely with a view to increase its pecuniary benefit, or diminish its pecuniary injury to man; another observes the bee building her cells and storing her honey simply as a matter of amusement; a third watches the

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Ichneumon as she glides with shivering antennæ over the surface of a leaf until she find the larva on whose living flesh her young is destined to feed; a fourth, with greater perseverance and more determined zeal, elaborates the previously unknown history of a single individual from the ovum to the imago; a fifth, by the aid of microscope and scalpel, thoroughly masters the phenomena of intimate structure, tracing every system of organs in its wondrous permeation of the insect frame, and not resting here, carries the physical knowledge thus gained into the wider and still more interesting field of physiology; a sixth spends days and nights in the capture of insects simply induced by their rarity; a seventh consumes the midnight oil in describing the new or the beautiful or the curious; an eighth ponders over systematic classification; a ninth labours to complete a monographic history: all these are hastening to the same terminus; are all, in fact, on their way upwards. We have long since been told that members of the human body must work together in concert: that the head must not say to the hand "I have no need of thee," or the hand to the feet "I have no need of you:" so with our science; the monographer cannot say to the collector, I have no need of you: the very admission of such a thought is a stumbling-block in our own way, a bar to our own progress. I wish to be understood as applying this last observation especially and emphatically to the case of the actual collector; to the man who, in whatever station of life, devotes his time, by night and by day; at all seasons, in all weathers; at home and abroad, to the positive capture and preservation of those specimens which serve as the objects for all our observations: he is the real labourer in the field, and if we would keep the lamp of our science constantly burning, it is to him alone that we can look for fuel to feed its flame.

With regard to collectors at home, I will only say, without mentioning names, that many members of our own Society have displayed more zeal and greater industry than would have sufficed for the accumulation of almost boundless wealth, and yet the only object they have sought has been the acquisition of treasure for the mind; the only reward they have desired, the satisfaction of possessing that which is rare or beautiful. I must also allude, if but for a moment, to the advantages derived from the labours of still another class, those who, led by an instinctive taste to the pursuit of Entomology, have rendered that taste subservient to pecuniary gain; I allude to such men as Bouchard, Weaver, Standish, Harding, and Foxcroft: how often have these made truly valuable contributions to our stock

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of knowledge! And is it not this result alone that, in fairness, we can consider? Such men do great, permanent and continual good: they render our science an unquestionable service, and their motives are no more to be called in question than those of the artist or the author, who receives the just reward of his well-directed labours.

The results of collecting in Britain, during each successive year, appear almost incredible; and, when we recollect the indefatigable zeal of those who have preceded us, it seems surprising that so much should be done. Our English collectors seem to have found in Scotland comparatively a virgin soil as regards Entomology, and a soil, I may add, of incomparable richness.

From British collectors the transition is easy to others, who, inspired by a like taste, led on by an insatiable thirst for a more intimate acquaintance with Nature in her grandest phases and forms, have left their homes, have abandoned their prospects of worldly welfare, and have sought, in warmer climes, those glorious creatures which our chilly regions cannot produce. Your late Secretary, once my most beloved and intimate friend, was one of these; and it has always been my belief, that while assiduously collecting in the Floridas, he laid the foundation of that painful and lingering disease which finally deprived our science of one of its brightest ornaments. Another loss, truly to be lamented, but of a very different character, is that we have sustained, not in the death of an individual, but in the destruction of a zoological treasure; I allude, of course, to the collections made by our friend Mr. Wallace. That energetic traveller, led by the thirst I have already described to behold with his own eyes, and not through the too often distorting medium of books, the exuberant luxuriance of animal and vegetable life as developed by the rays of a vertical sun, devoted himself to the acquisition of, and actually acquired, a most intimate knowledge of the Natural History of the Valley of the Amazons; but alas, returning with his hard-earned treasures, the ill-fated 'Helen,' in which he was a passenger, took fire and went down in mid-ocean, leaving our friend to buffet with the waves. Providentially he escaped; he was picked up by the 'Jordeson' two hundred miles from land, and has lived to record in glowing words the history of his discoveries, his triumphs, his losses and his preservation. I cannot forbear to quote from his own pen the record of his feelings, when, no longer in jeopardy, he first realized the enormous loss he had sustained:—

"It was now, when the danger appeared past, that I began to feel fully the greatness of my loss. With what pleasure had I looked

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upon every rare and curious insect I had added to my collection! How many times, when almost overcome by the ague, had I crawled into the forest and been rewarded by some unknown and beautiful species! How many places, which no European foot but my own had trodden, would have been recalled to my memory by the rare birds and insects they had furnished to my collection! How many weary days and weeks had I passed, upheld only by the fond hope of bringing home many new and beautiful forms from those wild regions; every one of which would be endeared to me by the recollections they would call up; which should prove that I had not wasted the advantages I had enjoyed, and would give me occupation and amusement for many years to come! And now every thing was gone, and I had not one specimen to illustrate the unknown lands I had trod, or to call back the recollection of the wild scenes I had beheld! But such regrets were vain, and I tried to think as little as possible about what might have been, and to occupy myself with the state of things which actually existed."

Mr. Wallace is now on the eve of departure for the eastern instead of the western world; he sails in H. M. S. 'Frolic,' first to Sydney and then to the islands of the Eastern Archipelago. His face is familiar to us here; his writings are known to most of us, and some of them are on the point of publication in our 'Transactions.' I am sure that there is not one member of the Society but will wish him God speed!

Commensurate to the losses of Mr. Wallace have been the successes of Mr. Bates. Next to those of our own country, we have been accustomed to regard the insects of South America as those with which we were most intimately acquainted: the Morphos, nothwithstanding their magnificence, the Buprestes, the Cerambyces, the Scarabæi, notwithstanding their magnitude, were yet regarded with comparative indifference; they were familiar as household words, and because familiar, they were held in little estimation. But Mr. Bates has developed new features in the Entomology of that extraordinary continent; has sent us collections which astonish us equally by the countless profusion, the variety, the novelty, and the excessive loveliness of the species which they contain. And here I venture to make a passing allusion to finance; and I do this without any collusion with Mr. Bates or his agent, our respected Treasurer. I wish to remind you that collecting objects of Natural History in South America is most expensive; that the mere transit of the entomologist from place to place, accompanied only by so much apparatus, and so many assistants as are absolutely

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necessary in virgin forests, where railroads, coaches, or even stage wagons are unknown, is in itself a formidable item of expenditure, and requires almost incessant labour to procure sufficient specimens for their sale to supply a bare return of the cost. Gladly would I induce even those entomologists who are not forming collections of foreign insects to bear a part of the burden, and to contribute their mite towards promoting a cause which must tend so materially to the advance of our science. But Mr. Bates, like Mr. Wallace, has contributed observation as well as manual industry: he has given us valuable information on economy, and, in his zeal for the acquisition of specimens, has not failed to make the needful commentary on their habits and manners, their food and their metamorphoses.

I must also mention, and on behalf of this Society, with profound gratitude, the generosity of our corresponding member, Mr. Thomas Jones Stevens, of Bogotà: the exhibitions of this gentleman's beautiful insects have added interest to our meetings, and the presentation of them has greatly enriched our collection.

Neither must I forget Mr. Edgar Leopold Layard, now present at our meeting, who has lately made a very large collection of Cingalese Lepidoptera, including an unusual number of the smaller species, particularly Pyralina.

The records and the collections to which I have been alluding, principally British, but occasionally exotic, have combined with others of economical or descriptive character to enhance the interest and attraction of our meetings; and I rejoice to observe that these are invariably well attended. I know of no Society in which the average attendance is so large in proportion to the actual number of members; and this leads me to remark on our acquisitions and losses under this head.

Five years ago it was thought desirable to institute a second class of members, to whom the name of Subscribers was applied. During the past year we have elected ten members and nine subscribers, and I regret to say have lost no fewer than four members and ten subscribers, thus giving us a gain on the year of six members, and a loss of one subscriber. With a single exception, our losses have occurred from resignation or default of payment; the exception is Mr. William Lancey, whose death we have to lament.

Mr. William Lancey was elected on the 5th of April, 1852, and towards the close of the same month, having accepted an appointment in the engineer's staff of the East Indian Railway Company, left this country for the seat of his employment. In April last, in the

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vicinity of Calcutta, he was seized with fever, from which he was apparently slowly recovering, when, at the recommendation of his friends, he undertook a palanquin journey to Delhi, for the purpose of recruiting his strength; on his return, however, to Calcutta, the excitement attendant on the trip subsiding, he grew rapidly worse, and alarming symptoms presenting themselves, he was urged at once to return to England; to this he acceded, but unhappily the virulence of the fever had so prostrated him that he never rallied, and expired on the 5th of May, a few days subsequent to the departure of the vessel. During his short sojourn in India he prosecuted Entomology with enthusiasm, and his collections, now in his father's possession, afford ample evidence how industriously he devoted every spare moment and opportunity to its pursuit.

During the year we have lost two other entomologists, unconnected indeed with our Society, but whose names have long been familiar to the veriest tyro in our science; I allude, of course, to Friedrich Germar and the venerable Fischer de Waldheim.

Ernst Friedrich Germar was born on the 3rd of November, 1786; at twelve years of age he was sent to school at Meiningen, where one of our most illustrious entomologists, Clairville, was then residing: in 1807 he removed to Leipsig, and purchased the celebrated collection of Inspector Hübner, in Halle: this collection is repeatedly referred to in the works of Fabricius, and was valuable as containing many of the type-specimens of that great entomologist. He here also made the acquaintance of Kunze and Kaden. In 1810 he obtained the degree of Doctor of Philosophy in the University of Halle. In 1811 he made a tour in Dalmatia. In 1815 he married Wilhelmine Keferstein, with whom he lived happily, although childlessly, during the remainder of his life. In 1817 he was appointed extraordinary, and in 1824, ordinary Professor of Mineralogy in the University of Halle: he died in July 1853, aged 66 years and 8 months.

The works of Professor Germar are numerous and valuable, principally on the sciences of Entomology and Mineralogy, in both of which his reputation stood very high. The first series of Professor Germar's Magazine was commenced in 1813, and concluded in 1818; and the second was commenced in 1839, and continued under the same title till 1845, when it merged in the 'Linnæa Entomologica,' which is still in course of publication. Professor Germar's most important entomological works are as under:—

'Dissertatio sistens Bombycum Species secundum oris partium diversitatem in nova genera distributas,' 1810—1812.

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'Magazin der Entomologie,' 1813—1822.

'Reise nach Dalmatien,' 1817.

'Insectorum Species novæ aut minus cognitæ descriptionibus illustratæ,' 1824; (contains descriptions of 891 species and 42 new genera of Coleoptera).

'Fauna Insectorum Europæ,' 1817—1847.

Professor Fischer de Waldheim, one of the few eminent entomologists that Russia has produced, was the last of that glorious band of naturalists whose fame was ushered in with the present century; the last, I should say, excepting that still more celebrated philosopher, the Baron von Humboldt: both these illustrious men have enjoyed, for at least half a century, a reputation which year after year has increased in lustre. Professor Fischer was born at Leipsig in 1770, and, after a most useful and energetic life, died at Moscow in 1853, at the advanced age of 82 years. In 1797 he accompanied Humboldt to Vienna, intending there to practise medicine, but devoted himself entirely to the study of Natural History, and more especially to that of the fishes of the Danube. He afterwards made a scientific journey through Germany and Switzerland, and then removed to Paris, where he aided Cuvier in his grand work, the 'Ossemens Fossiles.' In 1804 he accepted the situation of Professor and Director of the Museum at Moscow, and continued to occupy it to his death. He founded the Imperial Society of Naturalists of Moscow, contributed largely to the Russian 'Annals of Natural History,' and occupied himself most indefatigably with all branches of his beloved science. His writings are numerous, and amongst them is a curious and valuable typographical history of the Bible. He was a member of more than eighty learned Societies, and was knight of the principal Russian orders: the honours he received in his own country afford a notable instance that Russia is not indifferent to scientific merit.

By our Treasurer's Report you have heard that our finances are in a very satisfactory state: it appears that, whereas, at the last audit, a deficiency of £28 was reported, it is now announced that our liabilities are no larger than our balance in hand, so that an improvement of nearly £30 has taken place in our fiscal condition. It must, however, be borne in mind, that £22 of our income in 1853 arises from a subscription raised for the express purpose of defraying previous expenses; and, much as we are indebted to those members who so generously assisted on that occasion, it is neither prudent nor just to look forward to such a source of revenue, but rather so to restrict our outlay that it shall always fall within our legitimate income. During

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the year we have issued three parts of the 'Transactions,' and since the close of the financial year a fourth, which was laid on your table at the last meeting: these are got up in the usual style of correctness, and are illustrated in a manner that must gratify our members and subscribers: with the value and importance of their contents you are already perfectly familiar.

By the Report of the Library and Cabinet Committee you have learned that both these departments are progressing favourably; and if there is a single cause for regret connected with either, it is that our really fine entomological library is not made more extensively useful by our members. Of our exotic insects I may, perhaps, be allowed to remark, that I consider it more desirable to obtain an arranged series of types than to attempt the formation of a complete collection of species: the cost of the former is trifling compared with its utility; the cost of the latter would be overwhelming to such a Society as ours, but devolves with propriety on a national institution. In this observation, I must not be understood as referring to the money-value of the specimens themselves, of which I know nothing, but simply to the items of cabinets, rooms, and labour in arrangement and preservation.

My predecessors have given a summary of entomological publications: I am glad to be relieved from this labour by the knowledge that the Society cannot judiciously incur the expense of its publication; and secondly, that the task is annually performed by my friend, Dr. Schaum, in the most complete and admirable manner in the 'Bericht,' which is presented by the author for the information of our members. The following works published in Britain may, nevertheless, be enumerated: —

'Insecta Britannica,' Vol. ii. 'Diptera;' by Mr. Walker.

'Exotic Butterflies;' by W. C. Hewitson, Parts v.—viii.

The following Catalogues of Insects have also been printed during the year, by order of the Trustees of the British Museum.

'Catalogue of Longicorn Coleoptera,' Part i.; by Mr. White.

'Catalogue of Hymenoptera (Andrenidæ);' by Mr. Smith.

'Catalogue of Homoptera,' Part iv.; by Mr. Walker.

'Catalogue of Neuroptera,' Part iv.; by Mr. Walker.

'Nomenclature of British Hymenoptera;' by Mr. Smith.

'Nomenclature of British Neuroptera;' by Mr. White.

'Nomenlacture of British Diptera;' by Mr. White.

Four important works are announced as in a state of forwardness, and three of them are advertised as in the press. I have no doubt

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that all of them, when complete, will advance the study of Entomology, and will reflect honour on the various authors.

1. 'Insecta Maderensia;' by Mr. T. V. Wollaston.

2. 'Geodephaga Britannica;' by the Rev. J. F. Dawson.

3. 'Insecta Britannica;' the third volume of the series comprising the 'Micro-Lepidoptera;' by Mr. Stainton.

4. The 'Natural History of the Tineina;' published under the superintendence of a Committee, consisting of Mr. Douglas, Mr. Stainton and Mr. Wing. A very novel feature in this work is, that it will be printed in four languages, English, French, German, and Latin. There can be no doubt that this will be a great advantage, seeing how often scientific works printed in one language, and that modern, become, as it were, sealed books to the majority of the scientific world.

On the continent the following works appear to demand an especial notice:—

'Monographie des Guêpes solitaires ou de la Tribu des Euméniens;' par H. F. de Saussure.

'Lepidoptera Microptera quæ J. A. Wahlberg in Caffrorum terra collegit;' by P. C. Zeller: published at Stockholm in 1852. This work contains descriptions of upwards of a hundred species, and is remarkable as referring solely to the Micro-Lepidoptera of a country of which I may truly say we were previously quite uninformed.

Gerhard's so-called 'Monograph of the Lycænidæ' is also completed, containing coloured figures and names of almost every species, and forming a moderately-sized 4to. volume: when I state that of this volume 21 pages only are letter-press, the explanatory term of "so-called," will, I trust, be understood.

M. Fischer has published a 4to. volume with plates, intituled 'Orthoptera de Fribourg.'

In the United States a new and improved edition has been published of Dr. Harris's elaborate work on 'Insects injurious to Vegetation.' This is a work of great merit; and, although its utility is mainly confined to the district of the insects of which it more especially treats, yet it is well worthy the deep and thoughtful study of every entomologist, and particularly of such as make economy and economic relation of insects with man the especial objects of their research.

The 'Linnæa Entomologica,' 'Entomologische Zeitung,' and 'Annales de la Société Entomologique de France,' have all appeared as usual.

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And now, Gentlemen, it only remains for me to thank you for your very indulgent attention. I am well aware how imperfect my brief address must appear when compared with the learned and detailed summaries prepared by my predecessors: but I trust entirely to your kindness in avoiding comparisons, and in accepting my humble attempt to express opinions, to which the Society is in no way pledged, and which I earnestly desire may only pass as those of an individual member.

Report of the Library and Cabinet Committee for 1853.

The various donations of British insects made to the Society during the year have been incorporated with the Collection. Both British and foreign insects remain in a good state of preservation.

The grouping of the foreign Lepidoptera has been commenced, and is still in progress; and we have the pleasure to announce that Mr. Hewitson has named the Diurnes presented to the Society by T. J. Stevens, Esq., and has promised his valuable assistance in naming the butterflies in the Society's Collection. If the aid of such of the Members as may be familiar with the other divisions of the Lepidoptera could be obtained, the naming of them would be greatly accelerated.

The Curator is still engaged in the selection of the duplicates from the general collection of Coleoptera. Mr. Jekel has afforded valuable assistance in naming the exotic Curculionidæ; and we have to thank Mr. Waterhouse for cleaning and setting several species of the same family, and Mr. Westwood for the commencement he has made in examining and selecting from the Javanese collection presented by Mr. Spence.

For want of funds at our disposal no books have been bound this year, but as some require it, we recommend that they may be done during the next year, if the means of the Society will permit.

The Catalogue of the Books in the Library, under the head of "Authors," is nearly complete; and the other portion, under the head of "Subjects," is about to be proceeded with.

(Signed)

J. W. DOUGLAS.
E. W. JANSON.
EDWIN SHEPHERD.
A. F. SHEPPARD.
S. J. WILKINSON.

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Abstract of the Treasurer's Accounts.

RECEIPTS.

	£	s.	d.
Balance on hand January 1st, 1853	8	9	4
Arrears of Subscriptions	11	11	0
Subscriptions for 1853	109	4	0
Admission Fees	16	16	0
Tea Subscriptions	6	7	0
Deficiency Subscription	22	0	0
Sale of 'Transactions' at the Rooms £ 24 5 5			
" " at Longmans' 22 14 6			
	46	19	11
	£ 221	7	3

EXPENDITURE.

	£	s.	d.
Arrears for 1852, to the Porter at Bond Street £ " 7 6			
" " Mr. Wisewould, Rent and attendance ... 9 8 2			
" " Mr. Webb, colouring Plates 6 18 6			
" " Mr. Newman, printing 'Proceedings' ... 4 4 6			
" " Mr. Standish, moving from Bond Street 10 15 0			
" " Messrs. Roworth, printing 'Transactions' 9 8 6			
" " Mr. Day, printing Plates 2 10 0			
" " Messrs. Ford and West, ditto 3 7 6			
" " Mr. Yates, ditto 1 5 0			
" " Mr. Westwood, Zincography..... 6 6 0			
	54	10	8
Rent to Midsummer	17	10	0
Insurance to Ladyday, 1854	2	10	0
Curator	18	4	0
Tea, thirteen meetings	13	0	0
Attendance, Coals, Cleaning, &c.	5	3	4
Mr. Greenway, for moving and fitting up cases &c.	1	15	0
Postage, Parcels, Stationery, &c.	5	2	5
Printing 'Transactions,' three parts	33	11	6
" 'Proceedings,' President's Address, &c.	22	18	0
" Plates	9	16	6
Colouring Plates	14	14	6
Advertisements, (Prize Essay)	"	11	6
Collector's Commission	"	6	0
Balance in hand	21	13	10
	£ 221	7	3

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Liabilities and Assets of the Society.

Liabilities.	£	*s.*	*d.*
Mr. Dunn, for Oil	2	7	8
Rent to Christmas	17	10	0
Mr. Westwood, for Plates ..	3	3	0
	£23	0	8

Assets.	£	*s.*	*d.*
Arrears of Subscriptions, good	10	10	0
Ditto, doubtful	4	4	0
	14	14	0
Add balance in hand	21	13	10
	36	7	10
Less Accounts due at Xmas.	23	0	8
True Balance in favour of the Society	£13	7	2

EDWARD NEWMAN, PRINTER, DEVONSHIRE STREET, BISHOPSGATE.

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GENERAL INDEX.

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TRANSACTIONS

OF THE

ENTOMOLOGICAL SOCIETY

OF

LONDON.

I. *Description of* Doubledaya Viator, *an apparently undescribed Sub-genus and Species of* Coleoptera *belonging to the Family* Languriadæ. By Adam White, Esq., F.L.S.

[Read May 6th, 1850.]

The family *Languriadæ* contains a not very numerous set of insects, which, among the *Trimera*, in some way represent the *Elateridæ* among the *serricorn Pentamera*. Their form is elongated, the elytra in most of the species are of a metallic blue or green, and the thorax in several is red, or red with a black mark or line. In the genus *Languria* the antennæ are not quite the length of the head and thorax put together, and they terminate in a flattened expansion, consisting of five joints. In the genus *Fatua* of Dejean, the joints of the antennæ are much lengthened; and the club or mass at the end, excepting its three terminal joints, which are small, is not much wider than the other joints. The legs too are much longer, the fore ones being not much shorter than the whole length of the insect, and the two other pairs are at least as long as the abdomen.* In both the tarsi, though well developed, are not particularly remarkable for size. The genus *Triacus* of Thunberg (Kongl. Vetenskaps Academiens nya Handlingar, xxv. 1804, p. 184), is synonymous with *Languria*, or nearly so. Its generic character is having perfoliate antennæ, with a 4-jointed club; three of the joints are lunate, and the last is globose; the thorax is quadrate and the angles are acute. The body

* In the genus *Macromera*, Hope (Trans. Zool. Society), the legs and antennæ are very long.

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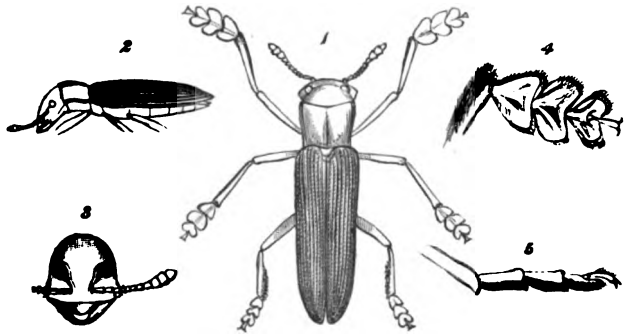
is linear-oblong, and the joints of the tarsi are three in number—the species is *T. clavicornis*—the thorax is of a shining blue, and the elytra are green; the thorax and abdomen beneath are blueish, washed with red. The genus *Languria* was established by Latreille in 1802, in the Hist. Nat. des Insectes, the type being *L. bicolor*, a North American species first described by Fabricius as a *Trogosita*. The following brief description may serve to make known the chief external characters of the sub-genus



DOUBLEDAYA.

Head decumbent, in front at the base of the jaws expanded and wider than the thorax (fig. 3). Antennæ moderate, with a longish club of four rather than five joints. Eyes small, prominent, but not projecting. Thorax as wide as long, margined on the sides, bisinuate at the base, grooved down the middle. Elytra elongated, sides nearly parallel, slightly margined, the margin thickened at the apex, which is abrupt. Legs very long, the two first pairs somewhat the longest, the femora and tibiæ compressed. Tarsi very wide, dilated, flat, all the joints wider than long; basal joint shortly cordate, second joint transverse, slightly cordate, third joint smallest, slightly cordate. The tarsi of first pair of legs the largest (fig. 4), those of the third pair not half so wide; the sides of the feet covered with short, uniform, dense hairs, arranged in transverse lines.

LANGURIA (DOUBLEDAYA) VIATOR (Fig. 1, 2).

This insect is a native of Madras, in the East Indies; the specimen described is unique, in the collection of the East India

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Company, and was kindly lent me by Dr. Horsfield. The head and thorax are highly polished and ferruginous, the elytra are of a pale ochreous red, and have from eight to nine thickly punctured, longitudinal, parallel striæ, some of them joined near the apex. The antennæ and legs are blackish and smooth, the tibiæ being furnished with some silky hairs at the apex; the soles are of a lively yellow. The under side of the body is ferruginous. The figure is carefully drawn on wood by Mr. William Wing, and engraved by Miss E. Bridges. Fig. 2 represents the profile of the insect of the natural size.

This singular insect is named after the late Mr. Edward Doubleday, Secretary of this Society, whose collections of insects in North America were about equally rich in all departments; for his mind was not content with running in one channel, however wide. Although at the British Museum he limited himself chiefly to the arrangement of *Lepidoptera*, his knowledge of other departments of Natural History was far from restricted, and the general collection of *Languriadæ* contains at least one species* collected during his travels in North America. This is not the place to eulogize one, whose monument will be—"The Genera of Diurnal Lepidoptera." The memory of his many virtues and ever ready assistance with heart, head and hand, cannot ever be forgotten by those who saw and experienced them. Capt. Smyth, late President of the Royal Geographical Society, at the annual address to that Society, alluded in a pleasing way to Mr. Doubleday's general geographical information. In matters connected with the United States he took a special interest. Mr. Bennett's account of our late secretary, read at the anniversary meeting of the Linnean Society, gives a very good account of his labours. The portrait of him, published by the Ipswich Society, and lithographed by Mr. Maguire from a Daguerrotype by his friend Mr. Bowerbank, will recall his intelligent and manly expression to his friends, while the profile medallion by Mr. Bernhard Smith, of Foley Place, is "likeness itself." Mr. Ford made an able lithograph from this medallion.

It may be objected, that it is contrary to the Linnean canon to name genera of insects after entomologists; but there can surely be no more reason for calling a showy or singular plant after a botanist, than a curious or fine insect after one who loved to study them. It would be well, however, if zoologists and botaists would follow Mr. Westwood's plan in naming *Erichsonia*, and not use the privilege till the naturalist was dead.

* *L. bicolor* (Fabr.) Say. Amer. Ent. t. 39, lower fig. (Ohio.)

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II. *Note on the* Pediculus Melittæ *of Kirby.* By F. Smith, Esq.

[Read 2nd February, 1852.]

As everything connected with the history of the genus *Meloë* must be highly interesting to the Entomologist, I have considered it desirable to lay before the Society a circumstance which, however perplexing it may appear, and however unsatisfactory it may be pronounced to be, is still intimately connected with an insect, the economy of which long proved a problem in natural history.

Mr. Newport, in his admirable paper on *Meloë*, published in the Linnean Transactions, mentions having found a larva resembling that of *Meloë* in form, but of a deep black colour, and having brown eyes, on a specimen of *Osmia spinulosa;* and he further observes, "this is certainly not the larva of either of the species of *Meloës* which I have observed;" although he says, "I am equally satisfied that it is the larva of some genus of the same family."

Now however probable this assumption may appear, and certainly it receives considerable support from the fact that the larvæ of several allied genera bear a striking resemblance to that of *Meloë*, still the assumption requires confirmation, based upon actual observation; for without such evidence we may hereafter learn that it was founded in error, so frequently do we see the early stages of one animal represented in the perfect state of another. M. Leon Dufour considered this animal to be an apterous perfect insect,* as also did Mr. Kirby, who named it *Pediculus Melittæ*. The opinion of Entomologists, generally, has been against these assumptions, but I think it will become a subject of greater perplexity than ever, and, at the same time, one of greater interest, when I relate the following observation.

On the 6th of April last, I visited a bank containing a colony of *Anthophora Hawortliana;* at that period the bees were in a semitorpid state, it being about six weeks earlier than their usual time of appearance. I placed a number of bees separately in pill boxes, and on examining them some days afterwards I was surprised to see several living specimens of the *Pediculus* running over the bees. This observation appears to me to render the question even more perplexing than before, or it is confirmatory

* Ann. des Sc. Nat. 1828.

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of Leon Dufour's opinion, that these supposed larvæ are in fact perfect insects.

In the history of all parasites, with which I am acquainted, their development is simultaneous with that of the insects upon which they are parasitic; but here we have a supposed parasite, in a supposed early stage of development, found in company with the perfect bee upon which it is supposed to be parasitic; it is certain that as the *Anthophoræ* had never quitted their cells, the *Pediculi* must either have found their own way into the nest, or have been conveyed thither by the parent bee of the previous season.

Assuming the latter to be the case, we find a creature in every respect similar to those deposited, after twelve months have elapsed, neither changed in form or colouring, and Mr. Newport has shown, that although he found full grown larva of *Meloë* in plenty in the cells of *Anthophoræ*, he did not meet with any in earlier stages, so that it is reasonable to suppose that the larva of *Meloë* conveyed into the bees' cells arrives at the perfect condition by the following spring. Further observation will, I hope, enable me to elucidate this subject; in its present position I am inclined to regard the *Pediculus* as being a perfect insect, which resides in the nests of bees, feeding on the pollen, and depositing its egg and undergoing its metamorphoses in the cells of bees; in fact it may be regarded as an insect of similar habits to the *Acari* which infest Humble-bees, and live in great numbers in their nests, feeding on the honey and wax, and to be observed there during summer in various stages of development.

* In the Rev. W. Kirby's own interleaved copy of the "Monographia Apum Angliæ" I observed a manuscript note appended to the description of *Anthidium Manicatum* to the following effect:—"On opening one of the cells of this bee, I was surprised to observe a *Pediculus* exactly corresponding in form with the *Pediculus Melittæ*, but of a bright yellow colour." It does not state whether the cell contained a larva, a perfect insect, or any thing besides the *Pediculus*.

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III. *Descriptions of some new Species of Hemipterous Insects belonging to the Tribe* Scutata. *By* W. S. Dallas, Esq., F.L.S.

[Read 2nd February, 1852.]

My principal object in the present paper is to publish descriptions of various species of *Hemiptera*, belonging to some of the smaller genera proposed or adopted by me in the first part of the Catalogue of Hemipterous Insects contained in the Collection of the British Museum.

Most of these insects are in my own collection; for two of them I am indebted to the kindness of Mr. Westwood, and one is unique in the collection of this Society.

Family ASOPIDÆ.

Genus Oplomus, Spin.

Oplomus elongatus, n. s. (Pl. I. fig. 1.)

O. elongatus, cæruleus, virescenti-nitens, punctatus; elytrorum corio opaco; abdominis maculis 3 spinaque basali, femoribus omnibus tibiisque posticis et intermediis fulvis; geniculis, tibiis anticis totis, alterisque apice, tarsis, antennis rostroque nigris. ♂.

Long. lin. 5½ (m. 0.012).

Hab. in Brasilia? In Mr. Westwood's collection.

Very elongate, deep blue, shining, tinged with green. Head, above, rather thickly punctured, but with two smooth longitudinal bands on the vertex between the ocelli; beneath thickly and finely punctured. Eyes brown; ocelli yellow. Antennæ black, clothed with a pale pubescence; basal joint tinged with blue. Rostrum pitchy black, becoming pitchy towards the apex. Pronotum with the lateral margins waved, the lateral angles very slightly prominent; the surface convex, rather thickly and finely punctured, with a narrow smooth line down the centre. Scutellum rather sparingly and finely punctured at the base; the apical portion with a smooth, impunctate, raised line down the middle, on each side of which the surface is very thickly and finely punctured; the lateral margins thickly and finely punctured, leaving a narrow impunctate space on each side between the margin and the band of punctures which accompanies the central raised line. Breast thickly and finely punctured, with a smooth space on each side of the medipectus;

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the posterior margin of the medipectus, and the margins of the orifice of the odoriferous apparatus, black; mesosternum with a slight yellow keel. Coxæ brown; thighs and trochanters orange, the former with their apices blackish; anterior tibiæ violet black, shining, sparingly punctured; intermediate and posterior tibiæ orange, blackish at the base, violet black at the apex, finely pubescent; tarsi black, tinged with violet, pubescent; claws reddish orange. Elytra with the coriaceous portion deep blue black, opaque, very faintly and not thickly punctured; the outer margin shining, with two rows of coarse punctures; apical margin smooth and shining; membrane brownish violet, shining. Margins of the abdomen very thickly and minutely punctured. Abdomen beneath rather thickly and finely punctured on the sides; disc smooth, with three large orange spots, placed on the third, fourth and fifth segments; basal spine orange, reaching the intermediate coxæ.

This insect is distinguished from all the species of *Oplomus* hitherto described, by its very elongate form, and the prominence of the lateral angles of its thorax; in other respects, however, it agrees precisely with the other species of that genus.

Family SCIOCORIDÆ.

Genus Sciocoris, Fall.

The genus *Sciocoris* appears to be peculiar to the eastern hemisphere, throughout which it is pretty generally distributed, species being found in the three old continents, in the eastern archipelago, and in Australia. Of the typical group of the genus (or *Sciocoris* prop.), however, including *S. umbrinus* and its immediate allies, no Australian species has hitherto, as far as I am aware, been described. This want will be supplied by the present species, for which I propose the name of—

Sciocoris australis, n. s. (Pl. I. fig. 2.)

S. pallidus, fusco-punctatus; capite subelongato, lineis 2 fuscis approximatis; scutello basi utrinque vitta parva albida; abdominis marginibus nigro-maculatis, ventre lineis 2 e punctis fuscis; antennis tarsisque apice nigris. ♀.

Long. lin. 3 (m. 0.006).

Hab. in Novæ Hollandiæ parte Australiore. In my own collection.

Ovate. Head longer than broad, with the lateral margins sinuated in front of the eyes; above pale yellow, thickly and finely

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punctured, with the lateral margins brownish, and two approximated brown longitudinal lines converging in front, running from base to apex; beneath testaceous, rather thickly punctured. Eyes black. Antennæ with the three first joints pale brown, the second and third joints about equal in length; fourth and fifth joints black, fourth longer than the preceding, fifth longer than the fourth. Rostrum brown, becoming black at the apex. Pronotum testaceous, rather thickly and finely punctured with brown. Scutellum rather narrow, elongate, with the sides nearly parallel, very slightly narrowed towards the apex; testaceous, finely punctured with brown, thickly at the base and on the sides, more sparingly on the disc; with a small black impression in each basal angle, and within this on each side a small, slightly elevated, impunctate whitish spot, from which a slightly elevated, impunctate line runs towards the apex of the scutellum, which bears a small brown spot. Breast testaceous, rather thickly punctured, the punctures of various sizes, and either brown or colourless; postpectus with a large dull yellowish patch, punctured with brown, on each side at the orifice of the odoriferous apparatus. Legs testaceous, clothed with shortish hairs; tarsi with the apical joint and the tips of the claws pitchy black. Elytra with the coriaceous portion pale testaceous, thickly and finely punctured with brown, with a double row of larger brown punctures parallel to the suture of the clavus, and two longitudinal impunctate lines on the apical portion; the membrane opaque, brownish, with brown nervures. Projecting margins of the abdomen pale testaceous, sparingly and finely punctured with brown, with a small black spot at the junction of each segment. Abdomen beneath yellowish testaceous, thickly covered with very fine pale brown points, and with a longitudinal band of dark brown points on each side, considerably within the stigmata; stigmata black.

Genus Mecidea, Dall.

It may not be out of place to mention here, that the genus *Cerataulax*, proposed by M. Victor Signoret at p. 335 of the last volume of the Annales de la Société Entomologique de France, is identical with the above-named genus; the species described by him being, however, quite distinct from both those previously described by me in the British Museum Catalogue. The distinctive characters of the three species are subjoined.

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*Antennarum articulo secundo tertio multo longiori.

1. *Mecidea quadrivittata.*

Cerataulax quadrivittatus, Signoret, Ann. Soc. Ent. Fr. 2me ser., ix. 336, pl. 10, f. 9 & 9 a.

M. albida, supra fusco-punctatissima; linea media thoracis et scutelli, thoracis linea utrinque marginibusque elytrorum albidis; corpore subtus utrinque fascia longitudinali e punctis fuscis; antennis fuscis. ♀.

Long. lin. 5—6 (m. 0.011—0.013).

Hab. in Insula Mauritius. In Mr. Westwood's and M. Signoret's collections.

2. *Mecidea Indica.*

Dall. Cat. Hem. 139. 1. Pl. 3, fig. 3.

M. pallide testacea, punctatissima, linea media thoracis et scutelli impunctata; antennis obscurioribus. ♂ ♀.

Long. lin. 5 (m. 0.011).

Hab. in India Orientali. In the collections of the British Museum and of Mr. Saunders.

† Antennarum articulis secundo et tertio longitudine fere æqualibus.

3. *Mecidea linearis.* Dall. Cat. Hem. 139. 2.

M. griseo-lutea, fusco-punctata; membrana hyalina; corpore subtus utrinque fascia longitudinali fusca. ♂.

Long. lin. 4½ (m. 0.009).

Hab. ? In the collection of the British Museum.

Genus ÆDNUS, Dall.

I have proposed (British Museum Catalogue of *Hemiptera*, p. 144), the formation of a genus under this name, for the reception of a species of the family *Sciocoridæ*, distinguished by the large size of its scutellum, which reaches nearly to the apex of the body, and thus gives it a considerable resemblance to some members of the Scutelleroid group, especially the *Podopidæ*. I have now to lay before the Society the description of a second species of the genus, which still more closely resembles the *Podopidæ* in its general form, and might easily be mistaken for a

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Podops at the first glance. The structure of the elytra, however, removes it at once from the Scutelleroides, for no portion of the inner or apical margins of the corium is covered by the scutellum: whilst in all Scutelleroides the inner margin, with a portion of the apical one, passes under the edge of the scutellum.

The species described by me in the British Museum Catalogue, under the name of *Ædnus obscurus*, inhabits the Philippine Islands and Java; the present species is from Hong Kong.

Ædnus ventralis, n. s. (Pl. I. fig. 3.)

Æ. fusco-griseus, nigro-punctatissimus; abdominis disco nigro; antennis testaceis, apice fuscescentibus; pedibus luteis, nigro-punctatis. ♂ ♀.

Long. lin. 3—3¾ (m. 0.006).

Hab. "Hong Kong." In my own collection.

Ovate, rather convex, pale greyish brown, very thickly and finely punctured with black. Head rather small, very minutely punctured with black both above and beneath. Eyes pale; ocelli yellowish. Antennæ slender, rather sparingly clothed with short hairs; three first joints testaceous, fourth joint pale brown, with the base testaceous; fifth joint pale brown. Rostrum yellow. Pronotum very thickly and finely punctured with black, with the punctures more distant on a slightly impressed space, which crosses the disc about the middle, forming a pale transverse band; immediately in front of this impressed space are four small pale tubercles. Scutellum very large, reaching very nearly to the apex of the body, constricted a little before the middle; very thickly and finely punctured with black, more thickly punctured and somewhat rugose towards the base, where there is a small smooth whitish point on each side within the basal angles; the basal angles themselves black. Breast rather darker than the upper surface, very thickly and finely punctured with black. Legs yellow; thighs with numerous black or brown points, the anterior pair with a double row of small black spines on the lower surface; tibiæ with a few brown points, and with a few minute bristles along the edges. Elytra with the coriaceous portion rather less thickly punctured than the thorax and scutellum; membrane transparent, colourless. Wings semitransparent, iridescent. Abdomen beneath deep shining black, slightly brassy, very thickly and finely punctured; the margins pale griseous,

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thickly and finely punctured with black; the edges with small black spots at the junctions of the segments.

Fam. HALYDIDÆ.

Genus Dinidor, Lap.

Dinidor lineatus, n. s. (Pl. I. fig. 4.)

D. testaceus, fusco-punctatus, pilosus; thorace lineis 4 nigris; scutello elytrisque nigro- vel fusco-lineatis; antennarum articulis 1 et 2 testaceis, subtus et secundo apice nigris, 3 et 4 basi albis, apice nigris. ♀.

Long. lin. 8 (m. 0.017).

Hab. in Americæ meridionalis provincia "Parà" dicta. In my own collection.

Ovate, testaceous. Head bifid in front; above rather thickly and coarsely punctured with brown, pilose, with a brown line down each side of the central lobe and two others on the vertex; beneath smooth, with a few brown punctures, pilose; antenniferous tubercles black above. Eyes brown; ocelli reddish. Antennæ with the basal joint greyish testaceous above, black beneath and on the sides; second joint above greyish testaceous, with the apex black, beneath black; first and second joints clothed with rather long slender hairs; third and fourth joints yellowish white at the base, black at the apex, with the extreme tip of the fourth joint whitish, both joints clothed with short fine hairs. Rostrum yellowish testaceous, with the tip black. Pronotum hexagonal, with the postero-lateral margins shortest, the antero-lateral margins slightly waved and fringed with longish hairs, the lateral angles rather acute but not prominent; irregularly punctured with brown, but with two rows of the punctures so placed as to enclose between them a central longitudinal impunctate line; the disc with four black longitudinal lines, of which the two central run from immediately behind the ocelli, becoming more distant towards the posterior margin; the two lateral, which are slightly waved, run from a little within the anterior angles to the postero-lateral margins a little way from the posterior angles. Scutellum rather long, somewhat pointed at the apex, pilose, punctured with brown, more coarsely at the base, more finely towards the apex, with a blackish line on each side at the base, within each basal angle, and two black lines on the disc neither reaching the base nor the apex, and enclosing between them a slight flat ridge, which is on a level with the elevated

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basal portion. Breast somewhat fulvous, punctured with brown, with an indistinct blackish band on each side close to the lateral margin; sternum deeply furrowed, impunctate. Legs fulvous, very pilose; claws tipped with black. Elytra with the coriaceous portion testaceous, not very thickly punctured with brown, the punctures of the disc finer than those of the margins; the disc with a brown line along the course of the submarginal nervure, and an indistinct line of the same colour within this, running from about the middle of the disc to the middle of the apical margin; membrane brown, with white nervures. Margins of the abdomen testaceous, punctured with brown, and fringed like the thorax with hairs, with a black mark at the junction of each segment. Abdomen beneath fulvous, pilose, punctured with brown on the sides, the disc impunctate; with a band formed of confluent black points on each side close to the lateral margin; apical portion of the basal vulvar plates black.

Family PENTATOMIDÆ.

Genus Tropicoris, Hahn.

This genus, established by Hahn for the reception of the *Cimex rufipes*, Linn., has hitherto contained only that species. It is placed among the *Rhaphigastrides* by Amyot and Serville, the typical species having a very minute spine at the base of the abdomen, but it must be considered rather as a transition from that group to the true *Pentatomides*,—the species which I have now to describe not possessing the slightest trace of a ventral spine, although in most other respects agreeing precisely with the *T. rufipes*.

Tropicoris latus, n. s. (Pl. I. fig. 5.)

T. supra griseo-fuscus, nigro-punctatus, subtus cum pedibus fulvus; capite, thorace antice, abdominisque marginibus nigro-æneis, his albido-maculatis; puncto albido in singulo elytro. ♀.

Long. lin. 6 (0.012).

Hab. in Brasilia? In my own collection.

Broadly ovate, above brown, very thickly and finely punctured with black. Head above blackish, tinged with brassy green, with the tip of the central lobe orange; the lateral lobes in this specimen scarcely meet in front of the central lobe; beneath pale fulvous, with a few scattered punctures. Eyes brown; ocelli reddish.

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Antennæ with the basal joint yellow; second joint whitish, with a blackish line on each side; third joint a little shorter than the second, pitchy, with the apex black, the base white; fourth joint longest, black, with the base white; fifth joint wanting; third and fourth joints sparingly clothed with fine hairs. Rostrum reaching the base of the abdomen, pale fulvous, with the apex and a line down the suture pitchy black; labrum with a slender black line down the middle. Pronotum transverse, with the lateral angles produced into large truncated processes, having their anterior angles rounded off, the posterior acute; antero-lateral margins faintly denticulated; disc brown, very thickly and finely punctured with black, and with two minute whitish points towards the anterior margin; anterior and antero-lateral margins and lateral processes blackish, tinged with brassy green. Scutellum triangular, nearly equilateral, brown, very thickly and finely punctured with black, especially towards the base, and with a minute whitish point in the centre of the base; apex concolorous. Elytra with the coriaceous portion brown, thickly and finely punctured with black, especially along the outer margin, the basal portion of which is brassy green; the disc with a small whitish point a little behind the middle; membrane brown, margins of the abdomen black, tinged with brassy green, thickly and rather coarsely punctured, and with a small whitish spot in the middle of the margin of each segment. Thorax beneath pale fulvous, thickly punctured; the punctures near the insertions of the legs and all those on the metathorax blackish or brown; metathorax with a small, raised, dull space, marked with five or six distinct wrinkles on each side, close to the orifice of the odoriferous apparatus. Legs fulvous, with a few pale reddish brown points. Abdomen beneath fulvous, thickly and very finely punctured, with the central line of the disc smooth.

Genus Amphaces, Dall.

This genus, proposed by myself, at p. 295 of the Catalogue of *Hemiptera* in the British Museum, is nearly allied to *Acanthosoma*, but is readily distinguished from it by the slight development here attained by the sternal keel and ventral spine. In the work above quoted I have described two species, which closely resemble each other in form and colour, differing principally in size and the relative proportions of the joints of the antennæ. The species which I have now to describe, and of which a single specimen exists in the collection of this Society, is of a much more elongated form than either of these, and is entirely of a pale green colour. Like the other species it is from Australia.

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Amphaces virescens, n. s. (Pl. I. fig. 6.)

A. elongato-ovata, virescens, punctata; oculis fusco-rufis, ocellis rufis; antennarum articulis 4to. et 5to. fulvescentibus; rostro apice nigro. ♂.

Long. lin. 6¼ (m. 0.013), hemelytrorum membrana inclusa.

Hab in Australia. In the collection of the Entomological Society of London.

Elongate-ovate, pale green. Head above minutely punctured and very finely wrinkled transversely; beneath finely wrinkled near the eyes, and with the disc minutely punctured. Eyes reddish brown: ocelli red. Antennæ with the three basal joints pale green, clothed, the basal joint very sparingly, the second and third more plentifully, with short hairs; basal joint rather strongly curved outwards at the apex; fourth and fifth joints fulvous (fifth darkest), very thickly clothed with minute hairs, which render their surface opaque; fourth joint nearly as long as the second. Rostrum passing the posterior coxæ, longer than in the other species, and with the fourth joint nearly as long as the first; pale greenish yellow, with the tip black. Prothorax above rather finely but not thickly punctured, with a slender smooth line down the centre, and a transverse impunctate patch on each side near the anterior margin; lateral margins very slightly reflexed; disc with a faint transverse furrow across the middle; postero-lateral margins tubercular a little behind the lateral angles; posterior angles very indistinct; prothorax beneath rather faintly punctured; scutellum rather elongate, with the apex acuminated; the disc rather convex, especially towards the base, rather thickly punctured, with a narrow smooth line down the middle; meso- and metathorax beneath nearly impunctate, but with a large common dull patch on each side, surrounding the orifice of the odoriferous apparatus, from which a short curved canal, with raised margins, runs towards the lateral margin of the metathorax; sternal keel whitish. Legs pale; thighs smooth, naked; tibiæ and tarsi rather sparingly clothed with hairs; claws tipped with black. Elytra with the coriaceous portion rather strongly, but not thickly punctured; the lateral margins very slightly reflexed; the membrane whitish, semi-transparent, with the nervures concolorous. Abdomen beneath strongly keeled in the centre, the keel smooth, becoming wider posteriorly so as to include the anal plate; the sides finely wrinkled transversely; basal spine just passing the posterior coxæ

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and touching the posterior point of the sternal keel; anal plate heart-shaped, dusky.

The anal plate in this specimen is raised so as to exhibit the more internal generative organs (fig. 6*a*), as is also frequently the case in *Acanthosoma;* in some species of which genus (*A. forfex*, m. and *elongatum*, m.), the crescent-shaped dorsal plate (a^*) attains a very great development. The same thing takes place in several instances in the males of the *Urostylidæ*.

Family UROSTYLIDÆ.

The next insect that I propose to describe belongs to a group which includes insects presenting such singular characters as to render their location in any of the great groups of *Hemiptera* a matter of some difficulty. Mr. Westwood, who, in 1837, first described three of the species comprised in it, placed them at the end of Mr. Hope's Catalogue of *Scutelleridæ* (*Scutati*, Burm.), and this is probably as nearly as possible their true position. Mr. White, in 1839, in describing (Mag. Nat. Hist. N.S. iii. 543, and Ent. Trans. iii. 94 [1842]) a new species belonging to the group, under the name of *Calliprepes Grayii*, considers it to be allied to *Capsus;* and Dr. Herrich Schäffer, in the same year (1839), in describing one of the species described in Hope's Catalogue, under the new name of *Typhlocoris semicircularis*, regards it also as belonging to the *Capsini*, in which family, he says, if we do not consider the structure of the elytra as one of its characters, it may form a peculiar group, the character of which would be, "Membrane with several distinct longitudinal nervures; corium without an appendix." As, however, the essential character of the *Capsini* is derived from the structure of the elytra, it would be manifestly absurd to admit into that family a group which was distinguished by not possessing that character. The error in both these cases arose from the authors referred to possessing only mutilated specimens of species of the genus *Urolabida*, in which the ocelli are wanting, giving them to a certain extent a more doubtful character than properly belongs to them. In the ninth volume of the Wanzenartigen Insecten, Dr. Herrich Schäffer recurs to his genus *Typhlocoris;* and whilst quoting as synonymous with it, Mr. Westwood's genus *Urostylis*, which he must have known had five joints in its antennæ, places it "without doubt" amongst the *Cœcigeni* of Amyot and Serville, in which the number of joints never exceeds four, and from which it differs in all its characters quite as much as from the *Capsini*. In the first volume

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of the New Series of the Transactions of this Society (p. 1), in describing a new genus and species (*Urochela 4-punctata*) belonging to this group, I stated it as my opinion, that the true position of these insects was in the tribe *Scutata;* and in accordance with that view I have proposed, in the British Museum Catalogue of *Hemiptera*, the establishment of a distinct family for their reception under the name of *Urostylidæ*. The insects included in this family are arranged under three genera, *Urochela*, *Urostylis*, and *Urolabida*, the last of which is distinguished from the other two by the want of ocelli, and includes the *Urolabida tenera* of Hope, originally described as its type, the *Urostylis histrionica* of Hope (*Typhlocoris semicircularis*, H. Sch.), and the *Calliprepes Grayii* of White, which is distinguished from the other two species by having the female generative organs of the ordinary form, and not produced into large forceps-like processes.

In the other two genera, as in the *Scutata* generally, the ocelli are present. The first, *Urochela*, which is distinguished from *Urostylis* by its stout antennæ, the first joint of which is not much longer than the head, contains three described species, viz., the typical species *U. 4-punctata*, and *U. bimaculata* and *obscura* described in the Museum Catalogue. The genus *Urostylis*, distinguished by its very long slender antennæ, of which the basal joint is as long as the head and thorax together, also contains three described species —*U. punctigera*, Hope, and *U. gracilis* and *pallida* of the Museum collection. I have now to add a fourth species to this genus.

Genus Urostylis, Westw.

Urostylis notulata, n. s.

U. supra testacea, fusco-punctata; elytrorum corii margine apicali fusco, medio flavo; corpore subtus fulvescenti, abdominis lateribus rufis, margine summo luteo; antennis fuscis, articulo basali testaceo, fusco-punctato. ♀.

Long. lin. 6—6½ (m. 0.0125—0.0135).

Hab. in Indiæ orientalis parte boreali. In Mr. Westwood's and my own collection.

Ovate, above pale testaceous. Head rather small, triangular, broader than long; impunctate, faintly wrinkled, with a small oblique pit on each side within the eyes; the apex of the lobes and the whole underside of the head pale yellow. Eyes dark brown; ocelli reddish. Antenniferous tubercles brown. An-

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tennæ clothed with very small whitish hairs; the basal joint testaceous, becoming dusky towards the apex, and covered with very minute brown punctures; second, third and fourth joints brown, the fourth rather paler than the others. Rostrum pale yellow, with the extreme tip black. Pronotum broader than long, trapezoidal, with the anterior angles rounded off; pale testaceous, rather thickly punctured with brown, with an abbreviated longitudinal red line on the centre of the anterior portion; the disc with a faint transverse furrow or impression before the middle; the portion between this furrow and the anterior margin elevated; prothorax beneath testaceous, finely punctured with brown, and with a pale reddish patch within each antero-lateral angle. Scutellum testaceous, rather thickly punctured with brown. Meso- and metathorax beneath pale fulvous, smooth, impunctate, with a large dull pale brown patch on each side. Legs clothed with fine whitish hairs; thighs yellowish testaceous, covered with fine brown points; tibiæ and tarsi dusky; claws brown. Elytra with the coriaceous portion testaceous, thickly and rather finely punctured; the punctures pale brown, the apical margin brown, with the central portion yellow; membrane transparent, colourless, with a dark brown spot in the inner basal angle. Wings semitransparent, brownish. Abdomen above bright red, shining, very finely wrinkled transversely, with a blackish line on each side within the margins; the margins brownish testaceous, edged with brown. Abdomen beneath with the disc pale fulvous, flat, shining, finely wrinkled transversely, covered with very minute brown points; the sides red; the margins testaceous.

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IV. *Description of a new Species of the Genus* Dinidor, *belonging to the* Hemiptera Scutata. By W. S. Dallas, Esq., F.L.S.

[Read 3rd May, 1852.]

As an addition to a paper which I had the honour of communicating to this Society at its February meeting, I beg leave to lay before the Society the following description of a singular insect belonging to the genus *Dinidor*, Laporte.

Dinidor gibbus, n. s. (Pl. I. fig. 7.)

D. fuscus, nigro-punctatus; thorace spinoso; scutello basi valde elevato, gibbo, apice subemarginato, bituberculato, et tuberculo obtuso pone medium; membrana fuscescente, fusco-reticulato. ♀

Long. lin. 8. (M. 0.017.)

Hab. in Brasilia. In Mr. Dossetor's collection.

Broadly ovate, brown, punctured with black. Head entire, and somewhat pointed in front, the lateral lobes meeting in front of the central lobe, with their lateral margins slightly reflexed; above spotted and punctured with black; beneath with two longitudinal black stripes. Eyes brown; ocelli reddish. Antennæ black, sparingly pilose; last joint wanting; basal joint with a few small orange-brown spots; second joint very long, with a slight constriction near its base; third joint about twice as long as the first, with its base reddish. Rostrum reaching the base of the abdomen, pitchy brown, with the tip blackish, and the base of the second joint somewhat fulvous; labrum testaceous. Pronotum with a small tooth at each anterior angle, its antero-lateral margins strongly waved, smooth, and its lateral angles acutely spinous; the disc convex and coarsely punctured posteriorly, with an irregular thickly punctured black band across the middle; the anterior portion sparingly and irregularly punctured. Scutellum with the base elevated into a large rounded tubercle, and with a small orange tubercle on each side on the basal angles; the disc with a small obtuse tubercle at the commencement of the narrow portion; the apex black, somewhat emarginate, with a slight tubercle on each side. Breast blackish, finely punctured, with a few orange-brown spots on each side; at the base of each leg a testaceous

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spot punctured with brown; mesosternum brown. Legs brownish orange, mottled with black; tibiæ with an indistinct orange ring in the middle; tarsi reddish, with the basal joint, the apex of the third joint, and the tips of the claws, black. Elytra; coriaceous portion brownish testaceous, rather thickly and finely punctured and mottled with brown; membrane brownish, semi-transparent, closely reticulated with brown nervures. Margins of the abdomen fulvous, punctured and spotted with black. Abdomen beneath brownish fulvous, very flat, with a distinct, smooth central furrow, the sides covered with small, black, somewhat confluent spots.

This species is rendered very remarkable by the form of its scutellum, of which the base is elevated into a large rounded tubercle, and the apex slightly emarginate, and bituberculate. The membrane of the elytra is also much more closely reticulated with brown nervures than in any other described species of *Dinidor*.

V. *Apparatus for destroying Mould on Insects, by the Vapour of Spirits of Wine.* Invented by M. Victor Ghiliani, Employé au Museum Royal de Turin. Communicated by John Curtis, Esq., F.L.S.

[Read 1st March, 1852.]

One of the most important objects, after amassing a collection of insects, is to secure its preservation; and one of the most essential requisites is a substantially-built and dry house. I need not enumerate the difficulties in tropical countries to secure preserved specimens of natural history from destruction; and even in North America the conditions of the climate, in some parts, are so peculiar, that at certain periods it seems next to an impossibility to preserve such objects from the effects of damp. In England there are three enemies to contend with—1st, *insects*, such as the larvæ of *Tineæ*, *Anobia*, *Anthreni*, *Acari*, and an *Atropos*; 2ndly, *grease* exuding from dead specimens; and lastly, *mouldiness*.

With any degree of care, none of the insect enemies are to be feared, excepting the *Atropos*; and in glazed drawers or air-tight boxes, with a constant supply of camphor, the contents are secure from these active little pests. Thanks to the experiments of Lepidopterists, a remedy is found against the greasing of insects,

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either by embowelling the larger moths, especially the males, or saturating them with pure spirits of turpentine or camphine, and then covering them with pipe-clay or magnesia.* The last plague is *mouldiness;* and I believe, as houses and villas are now built around the metropolis, with walls one brick thick, often on a clay soil, as well as in damp and wooded districts, this disease is not to be avoided. In the various houses I have inhabited in the west end of London, and even at St. John's-Wood, my collections never suffered from mould; but when I resided at Hayes, in Middlesex, on a tenacious soil, I found my collections, after four years, suffering so extensively from mould, that I determined on returning to town; and, by regular attention, I observe it is fast disappearing.

As this is so important a subject to many of our scientific friends residing in the country, I made it one of my objects, in visiting the museums on the continent, to learn the best means of restoring a mouldy collection to a clean and healthy state; and I am happy in being able to communicate a mode, safe, cheap and expeditious. Instead of washing the specimens individually with alcohol, or submitting them to the vapour of bruised laurel leaves—by the process I wish to submit to the Society, forty drawers may be cured in a morning, without removing a single specimen, at the expense of half a pint of alcohol.

My friend M. Ghiliani gave me permission to make known this admirable plan, and was so obliging as to put it in practice, that I might be convinced of its efficacy, and, at the same time, entirely comprehend the process. It was a box of large mouldy beetles, &c., which was subjected to the operation, and in three minutes every specimen was freed from mould.

The apparatus consisted of a stool, a pan and a lamp, which I will now describe. (Pl. II.) The stool (fig. A.) must have a flat top (1), larger than the drawers or boxes infected, say two feet square (C). A circular hole (2) is cut in the centre, large enough to admit a tapering pan (B). Round this aperture is a square frame attached (3), about two inches broad, and one and a-half inch deep; upon two sides of this a little spline (4) is fixed, about half-an-inch square. The pan (B) should be of block-tin, four and a-half inches deep in the clear, three or three and a-half inches broad at the top, with a rim (5) three-quarters of an inch broad, having the two edges slightly raised. A small hand-lamp (6), with oil and a cotton-wick, is necessary, and three or four pieces of wood, like bungs (7).

* All these remedies have been described in the Zoologist and other periodicals.

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When required, fill the pan (B), (not more than half-full of spirits of wine (see the dotted line 8), otherwise it might boil over,) and drop it into the aperture (2); then light the lamp, and place it upon as many of the blocks as will raise it sufficiently for the flame to heat the spirit. As soon as it boils, take the drawer of insects, reverse it, and place it upon the frame, over the pan, from which the vapour is arising, keeping it close down for one, two or three minutes, according to the size of the insects, when the mould will have vanished: then hold the drawer before a brisk fire, or place it in the sun for a short time, and the operation is terminated. Where many drawers are to be cleansed, as soon as one is taken off the stool to be dried, another may be placed over the bath, and thus a dozen may be done in half-an-hour. Great care must be taken not to let the spirits boil over, which is scarcely possible if the pan be only half-filled; and the raised edges of the rim not only strengthen the pan, but prevent any spirits from running over. If a lid be placed over the pan, it will very soon boil, when of course it must be removed.

There is another advantage by this process. All mites and destructive larvæ of insects are instantly annihilated, without the slightest injury to the collection.

Dr. Chavannes, of Lausanne, tells me he purifies his collections, when infested by destructive insects, by admitting into his boxes sulphuretted hydrogen, but that is an operation which it would not be safe to entrust to any persons who are not accustomed to chemical experiments.

EXPLANATION OF THE PLATE. (Pl. II.)

Fig. A. A 4-legged stool drawn in perspective.
1. The top.
2. A circular hole.
3. A raised square frame.
4. A spline or bead to confine the drawer and keep it in its place during the operation.*
6. A lamp.
7. Three small blocks of wood.

B. The pan of block-tin.
5. The rim, with raised edges.
8. Level of the alcohol.

C. Diagram to show nearly the relative proportions of the top of the stool; the figures according with those employed in Fig. A.

* When smaller drawers or boxes are to be purified, a smaller frame may be placed inside of fig. 3 for them to rest upon, so that no vapour may escape; and as this is a sketch of M. Ghiliani's first idea, many other improvements may suggest themselves to those who employ the apparatus.

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VI. *Descriptions of Five new Species of Butterflies, of the Family* Papilionidæ. By W. C. Hewitson.

[Read 3rd May, 1852.]

Papilio Telearchus. (Pl. VI. fig. 3.)

Upperside. Anterior wing of a rich purple, triangular and pointed at the apex, with an oval spot of blue at the end of the cell, a submarginal row of eight triangular spots of blue and white further from the apex than the rest of the outer margin. Half way between this row of spots and the spot at the end of the cell, a second parallel row of seven larger triangular blue spots, that nearest the anal angle double. Posterior wing brown, with a submarginal line of indistinct black spots, those nearest the upper margin pupilled with blue.

Underside light rufous brown, with a submarginal line of white spots corresponding with those above. Anterior wing with a basal white spot. Posterior wing with two.

Exp. $4\frac{7}{10}$ inch.

Hab. Sylhet.

In my own collection.

This species is very closely allied to the *P. Paradoxa* of Java, from which it scarcely differs in marking, except in the relative distance of the blue spots from the outer margin. It is, however, very different in the contour of the anterior wing. Whilst that of *P. Paradoxa* is rounded at the tip, the wing of *P. Telearchus* is lengthened to a point. It is, too, a much larger butterfly, and bears no closer likeness to *P. Paradoxa* than some of the *Euplæas* of different species (which it represents in the genus *Papilio*) do to each other.

Papilio Pausanias. (Pl. VI. fig. 2.)

Upperside black, the base of each wing glossed with bluish-green; anterior wing oblong and narrow, rounded at the tip, the outer margin nearly straight, with a central spot of yellow—one half of which is in the middle of the cell, the other below the median nervure and tripartite. At the apex a round almost transparent patch. Posterior wing very short, dentated, with a submarginal row of white lunular spots.

Underside brown. Anterior wing in markings as above. Posterior wing with the white lunules of the upperside, and above them a row of similar lunules (but more pointed) of crimson, with parallel

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rays of light brown between them and the cell. The ray nearest the inner margin joined to a line of crimson proceeding from the base of the wing. Some basal spots of the same colour.

Exp. 3½ inch.

Hab. Surinam and the River Amazon.

This species is most nearly allied to *P. Choridamas* (Boisduval), and is especially interesting from the close resemblance which it bears to *Heliconia Clytia*.

The first specimen which I have seen was added to my collection by the liberality of Mr. Charles Simm, of the Royal Engineers, who brought it from Surinam; others have since been sent home by Messrs. Bates and Wallace, from the River Amazon. Mr. Bates states that it is found "at the edge of the water in the Lake of Ega, when the river is falling."

Papilio Chabrias. (Pl. VI. fig. 3)

Upperside black. Anterior wing with three small oval spots of dirty white in a line parallel to the outer margin; one near the apex, the other two near together, and half-way between the first and the inner margin of the wing. Posterior wing strongly dentated, with a large spot of yellow below the middle, divided by nervures into six unequal parts.

Female without the spots on the anterior wing. The posterior wing with the spot of yellow divided into four oblong parts below the cell.

Exp. 2½ to 3 inches.

Hab. River Amazon.

In the collection of Mr. Saunders.

Nearly allied to *P. Triopas*, from which it differs in the form of the anterior wing, and in having the spots on both wings much nearer to the outer margin.

M. Lacordaire, speaking of *P. Triopas*, says that it flies low and near the ground, having probably met with the female only. Mr. Bates tells me that "the male flies rather high in pathways or thinned parts of the deep forest, but that the female flies low over the fallen leaves and low plants."

Papilio Orellana. (Pl. V. fig. 2.)

Upperside black. Anterior wing pointed, glossed with purple except near the apex, which is lighter. Posterior wing also glossed with purple near the base, dentated, one of the teeth slightly prolonged. The whole of the space below the cell (in-

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cluding a part of the cell), the margins excepted, of a dull vinous crimson, with four bright clear crimson spots near its lower margin. A spot of crimson on the anal fold.

Underside black, with the four bright spots only of the upperside, and a fifth at the anal angle.

Exp. $3\frac{7}{10}$ inch.

Hab. River Amazon.

The only specimen of this very distinct species which I have seen is in the private collection of Mr. Bates, at whose suggestion I have named it after one of the explorers of the Amazon.

Mr. Bates (who has kindly sent me some interesting notes on the diurnal *Lepidoptera*), in speaking of that section of the genus *Papilio* to which this species belongs, says, "that they are seen only in the shades of the forest, most frequently in the moister portions of it. They are generally of slow flight. Whilst the males are rather bolder and aspire to the flowers of the lower trees, the females wander about threading the mazes of the forest and settling on leaves of low plants, on which I have frequently seen them depositing their ova. The boldest flier of the beautiful creatures is the male of *P. Sesostris*, which sweeps grandly at times from near the ground to the summit of the lofty forest."

Papilio Sakontala. (Pl. V. fig. 1.)

Upperside black. Anterior wing pointed, with numerous indistinct rays of a lighter colour between the median nervure and the outer margin, and in the cell. Posterior wing oval, dentated, one of the teeth produced into a short tail; crossed near the middle by a curved band of indistinct unequal white spots, the three between the median nervules larger than the rest, and oval. A very small lunule of scarlet at the anal angle.

Underside. Anterior wing as above, but lighter. Posterior wing with the central band more distinct and formed of seven spots, decreasing in size towards each margin. The first four spots of this band (counting from the upper margin) followed between them and the outer margin by yellow lunules; the sixth by two lunules, one near the band obverse and lilac, the other near the margin, scarlet; the seventh (at the anal angle) by a large oblong spot of the same colour, with a black centre.

Exp. $3\frac{8}{10}$ inch.

Hab. Sylhet.

The only specimen I have seen is in my own cabinet. It is most nearly allied to *P. Polytes* of Cramer, which is said by some to be the female of *P. Pammon*.

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VII. *Characters of undescribed* Coleoptera, *brought from China by R. Fortune, Esq.* By W. Wilson Saunders, F.L.S., M.E.S. &c.

[Read 3rd May, 1852.]

The Entomology of China is yet but very imperfectly known, notwithstanding that the Collections of Entomologists have been abundantly supplied with specimens from that country during a long series of years. This peculiarity is chiefly to be attributed to the restrictive system of the Chinese, which, until within a very late period, prevented travellers and collectors from investigating the natural productions of this remarkable part of the world, and to the fact that the only entomological specimens to be obtained were those collected for sale by natives in the vicinity of Canton. The Chinaman, with little of the philosophy of Entomology about him, during his researches after insects kept chiefly in view the bright, beautiful, and large in size, his object being to please the eye only. He cared little about the less showy and small species, these not suiting his purpose; and we therefore find, in the Chinese collections, the same species occurring over and over again, and arranged into cases with the same precision and uniformity; the object being to make a pretty picture, by placing the specimens in curves or radiating lines having a common centre, and without any attempt at classification or putting allied forms together. Flies, bees, moths, and beetles, were placed side by side without distinction, and the species were only valued for their various hues and tints, and for their beauty and brightness; and the ruling idea in placing the specimens in the cases seems to have been to form a pretty and lively pattern, much in the same way that the worker in inlaid woods contrasts his materials to produce a pleasing effect. Collections so formed came to Europe of ancient date, and the species contained in them have been well described by Entomologists, exciting much interest from their great beauty and remarkable forms. This interest, however, gradually declined, from the want of novelty in the increasing number of specimens which found their way to Europe; so great, indeed, was the supply at last, and so little the demand, that a few years back more than 200 cases of these insects, each on the

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average containing more than 100 specimens, could not find a purchaser at two shillings and sixpence per case.

These picture collections gave a pleasing idea of the entomological riches of China, containing, as they did, many beautiful species and peculiar forms; and the naturalist only longed for some chance which would increase his knowledge of an entomological fauna apparently so rich. From time to time, however, it may be remarked, a few specimens of Chinese insects, from localities far from Canton, were sent home, the result chiefly of government expeditions, and the exertions of missionaries, or of individuals to whom chance had given an opportunity of collecting. These extra sources were, however, not frequent, and the additional number of species obtained from them were very limited, but still full of interest.

The opening of the trade with China, a few years since, was the first opportunity which offered for obtaining a more extended knowledge of the natural productions of the country; and although at first jealousies and restrictions prevailed, these are now beginning to wear away, and we are at last, as far as Entomology is concerned, beginning to reap the advantages of the change.

The exertions of R. Fortune, Esq., a gentleman who has been able to penetrate into a very remarkable portion of the country, and whose very valuable and interesting narrative of his journey has just been published, has brought many new and remarkable species to light, adding greatly to our knowledge of the subject; and J. C. Bowring, Esq., our corresponding member at Hong Kong, whose sphere of action is more limited, has shown by the very interesting collections he has sent to this Society, that he is ably investigating the Entomology of his district, and doing much for the science.

It is, however, to the labours of the former gentleman that I am desirous of drawing the attention of the Society, as I purpose in this and other communications to describe a portion of the new species discovered by Mr. Fortune; and the remainder, excepting the *Lepidoptera*, I am happy to say, will be taken in hand by other Entomologists, who have offered their services, and who will do the subject full justice. I except the *Lepidoptera*, for a part of this order has been undertaken by Mr. G. R. Gray, who has read an interesting paper before the Zoological Society on the diurnal species; and it is to be hoped that the new species belonging to the nocturnal families may be described by one so well qualified for the task.

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Much praise is due to Mr. Fortune for the attention he was able to give to the subject of insects during his interesting journey after plants and seeds of the tea shrub, for it must be borne in mind, that Entomology formed no portion of his arduous duties, and it was only a desire to make himself generally useful to the scientific world which induced him to collect insects, he well knowing how interesting they would prove to the Entomologist.

Mr. Fortune has kindly furnished me with a short account of the district from whence the greater portion of the specimens were obtained. He informs me, that this district is included between the parallels of 26° and 32° north latitude, on the east coast of China. Some were taken on the Island of Chusan and on other members of the Chusan Archipelago, but these form only a very small portion of the whole collection. Looking to a map of China, the country which he visited will be perceived at once. From the Islands of Chusan his researches were extended westward to 116° east longitude, that is to say, from about 122° to 116°; and hence it will be evident that he penetrated some considerable distance into the interior of the country. With the exception of the great plain of Shanghai, the country visited is of a mountainous character, running into elevations from 1000 to 2000 feet in height. The chief of the larger and more interesting species were obtained from this elevated district. Clay, slate, and granite, are the most abundant rocks in this hill country. The soil is generally of a reddish colour, composed of clay, sand, and vegetable matter, and much mixed with particles of the rocks of the country. The vegetation of the district appears to be luxuriant and abundant.

Turning now to the specimens which Mr. Fortune collected—they consisted of insects of all orders, among which were a considerable number of well-known forms, combined with others of very great rarity, and a large number of altogether new species. Of the latter, those described hereafter will fully establish the value of Mr. Fortune's researches; and I may mention, among insects of great rarity and interest, the following *Coleoptera* as particularly worthy of notice.

Dicronocephalus Wallichii ♂, which had only previously been obtained from Nepaul. A single ♂ specimen was procured, and this has all the characters of the Indian examples, except that the horns on the clypeus are less elongate, and but little curving upwards at the extremity. In this respect the specimen much resembles the figure in Gory and Pecheron's monograph of the *Cetoniadæ* (pl. 26, fig. 1). The female of this interesting and remarkable insect is still unknown, and should be carefully sought

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after by collectors who are in a situation to clear up the difficulty.

Xylotrupes dichotoma, a fine scarabeus, with a remarkably branched and elevated horn arising from the head.

Oplophora Horsfieldii, Hope, figured in the Transactions of this Society, Vol. IV. Pl. I. fig. 1, a longicorn of great beauty, and large size. This specimen, described by Mr. Hope, was taken in Chusan, by Dr. Cantor.

I shall now proceed to the description of several new *Melitophila*, commencing with a very well marked and new genus of Goliath beetles.

COSMIOMORPHA, new Genus. (Κόσμιος Μορφη.)

Head porrect, with the clypeus subquadrate, rather longer than broad, the sides parallel, the anterior margin slightly emarginate, the fore angles obliquely truncate, and the contour slightly elevated. *Mandibles* with the horny blade regularly lanceolate and pointed. *Maxillæ* with the upper lobe small, lanceolate, pointed, and incurved, externally covered with rigid hairs; the inner lobe ending above in an angulated point; palpi short. The mentum oblong, narrowed in front, and having the anterior margin slightly emarginate, with the labial palpi short.

Thorax very gibbous and rounded in front, about as long as broad, the lateral margins nearly parallel, slightly emarginate in the centre, the posterior margin straight, with the angles prominent.

Elytra rather broader than thorax, narrow and rounded at the apex; the shoulders prominent, with the lateral margin immediately behind slightly emarginate.

Legs long and slender, the anterior pair in the ♂ having the tibiæ elongate, with slight traces of two obtuse teeth on the outer margin, and one long spine on the underside, near the apex, projecting downwards; those of the ♀ shorter, more robust, and the tibiæ bidentate. Mesosternal process rounded in front, with the sides nearly parallel, moderate in size.

The nearest relationship of this genus appears to be with *Jummos*, W. W. Saund., although from the long and slender legs and colour of the only species known, it might seem to come near to *Dicronocephalus* of Hope. Its unarmed clypeus, character of fore tibiæ in ♂, and the resemblance of the females, are the reasons which induce me to place it immediately before *Jummos*, from which it is distinguished, as well as from *Rhomborhina* of

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Hope, by the slender legs, shape of clypeus, and arming of the fore tibiæ in the ♂, as well as by the dull colour of the insect, which is very unusual among the Goliath beetles.

Cosmiomorpha modesta, mihi. (Pl. III. fig. 1 ♂; fig. 2 ♀.)

Head with the upper surface deeply punctate, pitchy black, with the antennæ dark chesnut brown. Thorax with the upper surface flat and deeply punctate, blackish brown, covered with short, stout, adpressed yellowish hairs, especially near the margin. Scutellum concolorous with the thorax, with patches on the basal angles of yellowish adpressed hairs. Elytra with two slightly elevated longitudinal ridges on each, parallel for the most part, but joining near the apex, the surface deeply and rugosely punctured, dark, dull, castaneous brown, with the suture and shoulders shining pitchy black; the whole surface covered with stout, adpressed, short yellowish hairs. Underside of body dark castaneous brown, thickly covered with yellowish hairs, except the mesosternal process and medial line of abdomen, which are smooth, shining, and slightly punctate. Legs dark castaneous brown, with the hinder tibiæ fringed with yellowish hairs. Tarsi elongate.

The ♀ is rather smaller than the ♂, and has the anterior angles of the clypeus less sharply truncate obliquely. In one specimen the colour is nearly black.

Length of ♂ 1 inch; ♀ of $\frac{8}{10}$ inch.

Fig. 1 *a*, maxilla ♂; fig. 1 *b*, mesosternum ♂; fig. 1 *c*, claws ♂; fig. 1 *d*, fore tibia and tarsus ♂; fig. 2 *a*, mandible ♀; fig. 2 *b*, maxilla ♀; fig. 2 *c*, mentum ♀.

In the collection of the British Museum, and ♀ also in my own.

Three specimens only of this insect were brought to England, one male and two females.

Rhomborhina nigra, mihi (Pl. III. fig. 3.)

Shining black. Clypeus large, somewhat broader in front and slightly rounded anteriorly, with an elevated rim, deeply punctate. Thorax with the hinder angles acute, the surface smooth and finely punctate. Scutellum moderate, the apex very acute and finely punctate. Elytra smooth, with the suture and two parallel equidistant longitudinal lines on each, very slightly elevated, finely punctate, shallowly emarginate behind the shoulders. Undersurface of body finely punctate, with apex of abdomen covered with brownish hair. Mesosternal process obtusely spatulate, rounded and broader in front, fringed with short hairs. Legs

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striato-punctate, the fore posterior tibiæ fringed with yellowish hairs; fore tibiæ with one large tooth externally in the ♀, unarmed in the ♂. Tarsi short, robust.

Length $1\frac{1}{10}$ inch.

In the British Museum and other cabinets.

This species is a near ally to *R. hyacinthina* of Hope, which is rather common in collections from Sylhet and Assam, but is smaller, having the clypeus less broad in front, and without any trace of the hyacinthine hue, which the Indian specimens always possess on the legs and underside of the body, whatever may be the dark tone of colour of the upper surface. The mesosternal process is also much less broad, and spatulate. Fig. 3 *a*, mesosternal process.

Rhomborhina Fortunei, mihi. (Pl. III. fig. 4.)

Head with the sides of the clypeus parallel, the margin slightly elevated, the upper surface flat, and minutely punctured, with a slight rounded elevation between the eyes, dark blueish green. Antennæ and eyes pitchy brown. Thorax trapezoidal, with the upper surface uniformly and minutely punctate, bright uniform dark green. Scutellum large, trigonate, sparingly punctate, uniform in colour with the thorax. Elytra rather broader than the thorax, slightly emarginate behind the shoulders, without any trace of longitudinal ridges, and transversely marked with minute wavy striæ, dark shining green. Underside of body finely punctate, dark shining green, with the joints of the abdomen narrowly margined with black. Mesosternal process moderate, with the sides parallel, and the apex obtuse. Legs with the femora dark shining green, tinged with brown. Tibiæ and tarsi black, the former edentate in the ♂, in the ♀ with one strong tooth near the apex.

Length 1 inch.

In the British Museum and other cabinets.

Inhabits the borders of woods in the hill country.

This species, it appears, belongs to the section which includes *japonica*, *dives*, &c., and approaches nearest to the former species in general characters. Two specimens of the ♀, which I possess, have a slight golden tint on the elytra in certain lights. Fig 4 *a*, mesosternal process.

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Tæniodera ornata, mihi. (Pl. III. fig. 5.)

Head with the clypeus broader anteriorly, emarginate, deeply and rugosely punctate, black, with two short longitudinal yellow lines near the eyes at the base. Antennæ castaneous brown. Eyes pitchy brown. Thorax much rounded in front, produced posteriorly into a central, slightly projecting lobe, deeply and rugosely punctate, black, with a long central golden yellow streak, and two elongate yellow spots on the outer margin. Scutellum black, moderate in size, with a broad golden yellow central streak. Elytra considerably broader than thorax, the shoulders prominent, narrower, and rounded at the apex, with a central longitudinal elevated rounded ridge on each elytron, and five or six thread-like, wavy, elevated lines between the ridge and the suture, and between the ridge and the lateral margin a reticulated surface of oblique, short, wavy raised lines; black, with the lateral margins, the apex, and anterior portion of the elevated ridges, bright castaneous brown, and having a golden yellow diamond-like marking on the centre of the suture, two rounded transverse spots between this marking and the apex, and two points on the lateral margin, all of a golden yellow colour. Legs black, shining, covered with castaneous hairs.

Length $\frac{6}{10}$ inch.

In the cabinet of the British Museum.

One specimen only of this species was taken by Mr. Fortune. It has a near relationship to some of the Indian species, both in shape and character of the colouring.

Protœtia intricata, mihi. (Pl. III. fig. 6.)

Head with the sides of the clypeus nearly parallel, the fore angles rounded, and the margin slightly elevated, deeply punctate, dark, bronzy green, more viridescent and shining in front. Antennæ and eyes pitchy black. Thorax rounded in front, with the posterior angles obtuse, and the basal margin receding near the centre to receive the scutellum, covered with broad shallow punctures, dark, bronzy brown, with two longitudinal rows of pale, irregular, yellowish spots, one on each side of the central line, between which and the outer margin are some faint, irregular, yellowish markings. Scutellum with the apex obtuse, dark, bronzy brown. Elytra rather broader than the thorax, deeply emarginate behind the shoulders, with two faint elevated longitudinal ridges, shallowly but broadly punctate, dark, bronzy

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brown, with various yellowish speckle-like markings, and a transverse, wavy line of dots on each elytron of the same colour, nearly crossing the disk a little below the centre, between which and the apex is another transverse, somewhat lunate, dotted, line-like yellowish marking, nearly touching the suture. Underside of body bright shining green, with the joints of the abdomen spotted laterally with yellowish white. Podex with two converging rows of yellowish spots. Legs dark, bronzy-green, robust. The two posterior pairs rough, with deep punctures, and fringed with yellowish hairs.

Length $\frac{6}{10}$ inch.

In the British Museum and other cabinets.

This is a species resembling in some respects two or three others, but its characters are distinct and apparently constant.

Porphyronota Sinensis, mihi. (Pl. III. fig. 7.)

Head small, black, with a large patch on the after portion pale chesnut-brown. Antennæ of the same castaneous colour. Thorax rounded in front, with the sides nearly parallel, the hinder margin convex and emarginate to receive the scutellum, pale chesnut-brown, with two small round black spots immediately behind the head, and a black central × like marking on the posterior half of the disk, the upper portion of the × being in shape of a broad U, and the lower portion with a decided angular projection on either leg, and having also four rounded somewhat confluent spots on either side of the × like marking. Scutellum trigonate, chesnut-brown, with the apex and a discoidal spot black. Elytra broader than the thorax, slightly emarginate behind the shoulders, faintly furrowed longitudinally, chesnut-brown, with numerous short, black, line-like wavy markings, mostly dispersed transversely across the ridges, and two subquadrate black spots on the disk, a little below the centre. Podex black. Underside of body shining black, with the mesosternal process, a patch near the shoulders, and some spots on the side of the abdomen, castaneous brown. Legs robust, black.

Legth $\frac{7}{10}$ inch.

In the British Museum and other cabinets.

Taken in hedges by the roadside, generally in the valleys among the hills. It also occurs in the vicinity of Shanghai.

This species very closely resembles some members of the genus from South Africa, and it is curious to observe forms so closely allied in parts of the world so far apart.

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VIII. *Descriptions of some new and apparently undescribed Species of Hymenopterous Insects from North China, collected by Robert Fortune, Esq.* By F. Smith, Esq.

[Read May 3rd, 1852.]

The *Hymenoptera* collected by Mr. Fortune, during his late travels in China, contained a number of species with which we were previously unacquainted; such I believe those to be described in this paper. If an estimate may be formed of the abundance of any particular family from an inspection of the collection, I should conclude that the *Vespidæ* are the most numerous in North China. A species of the genus *Rhynchium* is particularly interesting, from the circumstance of its being stylopized, thus adding to our knowledge of the geographical range of these parasites. But perhaps the most interesting insect is a species of the genus *Pison*, the largest hitherto discovered; in Australia many species are found, that country appears to be their metropolis; in other localities they appear to be very rare. One or two of the species of *Bombi* from North China have also been met with in Northern India. The *Ichneumon* belonging to the genus *Cryptus*, described in this paper, is probably the most beautiful species of the family. The precise locality, in some instances, is given from information kindly communicated to me by Mr. Fortune himself.

Trogus Pepsoides.

Female.—Black; head and antennæ pale yellow, the latter dusky towards their tips. The prothorax, mesothorax, tegulæ and scutellum, reddish yellow; the mesothorax has two divergent longitudinal pale yellow stripes; the breast beneath suffused with yellow; the legs yellow, excepting the coxæ, intermediate femora beneath, and the posterior femora, which are black; wings yellow, their apical margins dark fuscous; the apical margins of the first and second segment of the abdomen more or less ferruginous.

Length 11 lines.

This species is in the collection of the British Museum.

Hab. Ning-po-foo.

Cryptus purpuratus. (Tab. VIII. fig. 2.)

Entirely of a brilliant purple; between the antennæ and the base of the clypeus is a prominence, the sides of which are transversely striate; the clypeus with deep punctures. The meso-

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thorax has a deep longitudinal incision, which is margined by elevated carinæ, on each side of which, double divergent carinæ pass forward from the scutellum to the anterior margin of the mesothorax; the scutellum with deep punctures; the metathorax rugulose, the sides sculptured with irregular transverse carinæ, some of which recurve and enclose on each side an oblong deep incision. Wings hyaline, and having a fuscous cloud occupying the first discoidal cell, and extending over a portion of the cells adjoining. The anterior tibiæ slightly ferruginous in front. The abdomen petiolate, gradually increasing in width and terminating in a quadrate club.

Length 9 lines.

Hab. Ning-po-foo.

The only specimen brought by Mr. Fortune of this insect is in the Museum collection; it is the most beautiful species of the genus with which I am acquainted.

Pison regalis. (Tab. VIII. fig. 9.)

Female.—Black; the head and thorax closely and strongly punctured; the face, as high as the notch in the eyes, clothed with hoary pubescence, that on the clypeus black; the clypeus truncate in front; the labrum slightly exposed, smooth and shining; the collar divided from the prothorax by a deeply impressed channel. The metathorax above has a deep central incision, crossed by transverse raised carinæ, which branch off laterally, and become obsolete before reaching the sides; towards its apex the metathorax is transversely rugose-striate; the tegulæ rufo-piceous; the wings smoky, and having an indistinct pale nebulosity towards the apex of the anterior wings, crossing the third submarginal cell. Abdomen shining and finely punctured, covered with a thin, short, black pubescence; the apical margins of the segments slightly constricted, and clothed with a thin, changeable, sericeous pile. The tibiæ and tarsi are densely clothed with pile of a similar colour.

Length 9 lines.

Male.—This sex only differs from the female in having a shorter silvery pile occupying the depressions of the face at the sides of the clypeus, which is nearly naked, and in having the sculpture more strongly impressed on the metathorax.

Hab. Ning-po-foo.

This is the largest species of the genus hitherto discovered, and the first from China. It would come partly into the second

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division of the genus according to Shuckard, who formed a subgenus for those species which receive the first recurrent nervure towards the apex of the first submarginal cell; it would therefore belong to his genus *Pisonitus;* but the second recurrent nervure is in accordance with the species of *Pison*, and therefore I prefer including it in the latter genus, to making a second subgeneric division. Species of this genus are rare from all localities except Australia, which appears to be its metropolis.

Cerceris Zonalis.

Female.—Black, deeply punctured; the face yellow below the base of the antennæ; a narrow yellow line running between the antennæ up to the anterior stemma; a minute dot at the vertex of the eyes, behind; the mandibles yellow, their apex black; the antennæ beneath, and their scape above, ferruginous, the latter yellow in front; the collar, tegulæ, post-scutellum, and a minute dot on each side of the metathorax, yellow; the legs fusco-ferruginous; the anterior femora and tibia in front, their tarsi in front, the intermediate and posterior femora at their apex above, their tibia in front, and the basal joint of the intermediate tarsi, yellow; the apex of the anterior wings dark-fuscous. The basal segment of the abdomen ferruginous, the third and fifth segments yellow, having their basal margins black.

Hab. North China.

Rhynchium flavo-marginatum.

Male.—Black; the head and thorax closely punctured; the clypeus, a minute spot between the antennæ, and the scape in front, cream-coloured; the entire margin of the clypeus black; the apical recurved joint of the antennæ ferruginous. An interrupted yellow stripe on the margin of the prothorax; the tegulæ have a ferruginous spot; the wings smoky, darkest at their anterior margins, and beautifully iridescent; the intermediate and posterior femora ferruginous above and the anterior pair at their apex; a cream-coloured stripe on the anterior tibiæ in front; the claws testaceous. Abdomen deeply punctured, the margin of the first and second segments yellow, slightly interrupted in the middle; beneath, the margins of the segments are rufo-piceous.

The specimen described is doubly stylopized; the heads of two female stylops project beneath the third abdominal segment.

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Rhynchium ornatum. (Tab. VIII. fig. 10.)

Female.—Black; the head and thorax coarsely punctured, the upper half of the clypeus, a spot between the antennæ, the scape in front, and a dot at the base of the mandibles, yellow; the mesothorax has a central short impressed line in front, and towards the scutellum a central slightly raised portion, smooth and shining, less closely punctured than the other part; the sides of the metathorax are roughened with separate deep punctures; the anterior margin of the prothorax has a bright orange stripe, attenuated in the middle; the outer margin of the tegulæ slightly ferruginous; wings fuscous, darkest towards their anterior margins; the anterior tibiæ have a yellow line in front, and the intermediate pair also an indistinct stripe; the knees slightly ferruginous; claws of the anterior tarsi testaceous. The first segment of the abdomen is orange-yellow, having at the base a triangular black patch; the second segment black, and having a broad orange-yellow fascia at its apical margin, deeply notched in front; the insect is entirely black beneath.

Hab. Tein-tung, near Ning-po, amongst the mountains.

Ancistrocerus flavo-punctatus.

Female.—Black; the head and thorax deeply punctured; the clypeus, a spot between the antennæ, the scape beneath, and a minute spot at the base of the mandibles, orange-yellow; the tegulæ rufo-piceous; wings fusco-hyaline; the sides of the metathorax coarsely rugose; tips of the femora, the anterior tibiæ in front, and the claws, ferruginous; the legs have a beautiful golden reflection; the abdomen coarsely punctured, except the second segment, which is finely and distantly punctate; the margins of the first and second segment have a bright orange-yellow fascia on their apical margins above; the second segment is considerably wider than the basal one, and has a beautiful sericeous reflection; the body beneath entirely black.

Length 8 lines.

This beautiful species I have not seen from any other locality than Ning-po.

Eumenes decoratus.

Female.—Black; the head and thorax coarsely and closely punctured; the clypeus, a spot between the antennæ, triangular-shaped towards the vertex, and two-thirds of the basal portion of the scape in front yellow; the two apical joints of the antennæ yellow

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beneath; a narrow yellow line traverses the inner margin of eyes from the apex of the clypeus to their notch; a short narrow yellow line behind the eyes towards the vertex; the apical half of the mandibles ferruginous. The prothorax, the tegulæ, two lines behind them, the apical half of the post-scutellum, and an obscure spot at the sides of the metathorax, orange-yellow; the wings sub-hyaline. The margins of the coxæ and trochanters beneath, the femora towards their apex, the tibiæ and the claws, ferruginous; the entire legs are clothed with a reflective golden pile. The basal segment of the abdomen closely punctured, its apical margin above, as well as those of the second segment, broadly, and the following segments narrowly, orange yellow; the abdomen has a beautiful sericeous reflection, and the second, third and fourth segments beneath have their margins yellow.

Length 12 lines.

The male, in colouring, does not differ in any respect from the female.

Length 9 lines.

Hab. Tein-tung.

Only two specimens of this fine insect have come under my notice; the species is in the British Museum Collection.

Eumenes quadratus.

Female.—Black; head and thorax roughly punctured, a yellow spot between the antennæ, and a line along the margins of the eyes from the base of the antennæ to their notch; the third, and the two or three following joints of the antennæ, rufo-piceous beneath; a yellow stripe on the collar in front; the legs rufo-piceous at their knees; the wings dark fuscous. Abdomen, the petiole elongate; its apical margin, as well as that of the following segment in the middle, yellow; the puncturing deep, but scattered on the petiole, closer on the second segment, becoming rugose towards its apical margin.

Length 9½ lines.

Male.—Black; the clypeus, the face above as high as the insertion of the antennæ, their scape in front and apical joint, yellow; the prothorax in front, a narrow line extending to the tegulæ, a line behind them, the post-scutellum, the anterior and intermediate tibiæ in front, the posterior tibiæ towards the base, and the knees, yellow. Abdomen, the apical margin of the basal segment, a minute spot on each side of the second, and an arched macula at its apical margin, yellow, the entire segment is covered

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with a beautiful sericeous reflection; punctured as in the female, but the wings paler.

Length 7½ lines.

This species somewhat resembles the *punctata* of Sausseur, but it is larger, the sculpture is very different, its wings are darker, and its petiole more elongate; from the exact similitude in form and sculpture I have placed these sexes together as constituting one species. They also agree in the form of their peculiar-shaped abdomen, which, viewed laterally, is square, having the upper angles rounded.

Hab. near Ning-po-foo.

Polistes sulcatus.

Female.—Black; the head, excepting the face above the insertion of the antennæ as high as the vertex of the eyes, ferruginous; the scape and the mandibles rufous; the prothorax, two spots on the disk of the meso-thorax, the scutellum and post-scutellum, the femora, tibiæ within, and the tarsi, ferruginous; the metathorax transversely sulcate. Abdomen, the second segment has an indistinct macula on each side, its apical margin, and those of the following segments, obscurely ferruginous; the apical one entirely so, and having a dark line down its centre.

Length 12 lines.

Male.—Black; the clypeus, and a line along the inner margins of the eyes, as high as their emargination, yellow, and covered with silvery pile; a broad ferruginous stripe down the centre of the clypeus; the scape beneath, and the tips of the joints of the antennæ beneath, ferruginous. The prothorax, tegulæ, the margins of the scutellum and post-scutellum, and the legs, ferruginous. Abdomen as in the female—the wings in both sexes are hyaline, having a ferruginous tinge, particularly at their anterior margins.

This species, although closely resembling the *Gyrostoma Orientalis* of Kirby, is very distinct, and, independent of sculpture, &c. is a smaller species.

Hab. near Ning-po-foo.

Vespa Mandarinia. (Tab. VIII. fig. 1.)

Female.—Black; the head, as well as the scape of the antennæ, of a reddish-yellow; the eyes, the pit in which the ocelli are placed, and the tips of the mandibles, black; the clypeus notched in front; the three apical joints of the antennæ slightly ferruginous beneath, the cheeks broadly dilated. The scutellum,

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which is divided by a central channel, has on each side an indistinct ferruginous spot, the tegulæ have a stain of the same colour outwardly, and the wings rufo-fuscous, with a darker colouring towards their base; the legs are rufo-piceous at their joints, and also the front of the anterior tibiæ. The basal and apical margins of the first segment of the abdomen have a broad continuous yellow band; a similar band on the apical margin of the second segment, and another towards its base which becomes pointed at the sides of the abdomen; the third, fourth and fifth segments have yellow bands on their apical margins, and the sixth is entirely yellow; beneath, the second and following segments are margined with yellow, the bands increasing laterally in width; above, the abdomen is beautifully aciculated, and the entire insect has a changeable sericeous reflection.

Length 1 in. 9 lines.

Worker.—Differs from the female in the following particulars: a ferruginous spot on the shoulders, the post-scutellum tinged with the same colour.

Length 1 in. 3 lin.

Hab. Tein-tung, near Ning-po-foo, amongst the mountains.

This is one of the finest species of the genus yet discovered. Mr. Fortune informed me that this insect constructs large globular nests in the topmost branches of trees, and is very abundant.

Vespa ducalis.

Female.—Ochraceous; the head large, the cheeks broadly dilated, the clypeus and mandibles rugose, the teeth of the latter, the region of the stemmata, a line on the scape behind, and a deep depression above their base, black; the prothorax, mesothorax, and anterior margin of the scutellum, black; the tegulæ black, their outer margins yellow; wings slightly fuscous near their base; the metathorax below the post-scutellum, the thorax beneath, and the femora, black; the apex of the coxæ, trochanters and femora, the tibiæ and tarsi, of a reddish yellow; the first and second segments of the abdomen entirely ochraceous, having above a central, transverse, black band, that on the second segment more or less interrupted, the rest of the segments totally black.

Length 1 inch 6 lines.

Worker.—Head as in the female, but of a redder hue; the anterior portion of the prothorax, the outer margins of the tegulæ, the scutellum and post-scutellum, tibiæ and tarsi, of a reddish

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yellow, the post-scutellum palest, the tarsi above fuscous. Abdomen, the first and second segments of a reddish yellow, having bright yellow marginal fasciæ, in front of which is a narrow band of a deep red-brown colour; the rest of the segments are black, the third has a bright yellow marginal fascia; the yellow fasciæ are continued beneath on the second and third segments, the rest are narrowly piceous.

Male.—The head ferruginous, the region of the ocelli and that between the base of the antennæ, also the teeth of the mandibles, black; the antennæ fusco-ferruginous above. The anterior margin of the prothorax pale ferruginous; the mesothorax has two small ferruginous spots in front; a spot on the tegulæ, and also the posterior portion of the scutellum, ferruginous, beneath which, on each side, is a bright yellow dot; the anterior tibiæ in front, also the tips of the femora, ferruginous. The first segment of the abdomen ferruginous, and at the base divided from the apical portion, which is yellow, by a black band; the second segment ferruginous, having a broad apical yellow band; the third and fourth are yellow, each having at their base a black band; the fifth, sixth and seventh segments are black; beneath, the second, third and fourth segments have a yellow band on their apical margins; the abdomen and legs are covered with a changeable golden iridescence.

Length 13 lines.

Habitat Tein-tung, near Ning-po-foo.

This species, as well as the preceding, were both first discovered by Mr. Fortune, and are fine additions to our *Vespidæ*.

Vespa Crabroniformis.

Female.—Nigro-fuscous; the head orange-yellow, the antennæ yellow beneath, the basal joint ferruginous; the mandibles ferruginous, their teeth black; the prothorax yellow, a broad central indistinct stripe on the mesothorax anteriorly, the tegulæ ferruginous; the wings fusco-hyaline, their anterior margins, from their base to the first submarginal cell, rufo-fuscous; the legs covered with an iridescent pile. Abdomen fusco-ferruginous; at the base, laterally, a bright ferruginous spot, the apical margin has a narrow yellow fascia; the second segment has also the apical margin yellow, rather more broadly so than the basal segment; the following segments are yellow, the third has at its base a tridentate, transverse, fusco-ferruginous fascia; the fourth merely two láteral spots of the same colour; the abdomen has a similar reflective pile. The entire insect naked, except a few black

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hairs on the vertex, and a little yellow pubescence on the sides of the metathorax.

The male exactly corresponds with the female, differing only in having the antennæ, as usual, elongated, and in having on each side of the second segment of the abdomen an oblique, indistinct, pale stripe running inwards, and also two minute pale dots.

Crocisa decora.

Female.—Black; the face, below the base of antennæ, clothed with pale blue pubescence; most sparingly so on the clypeus; a continuous fringe of similar pubescence behind the eyes and along the margin of the vertex. Thorax, a stripe on the collar, another in the centre of the mesothorax, reaching the disk, a dot on each side opposite the tegulæ, which have a spot behind, and also an epaulet, and two round spots on the posterior margin of the mesothorax, of blue pubescence; on the sides of the metathorax a patch of long white pubescence; beneath the wings is a stripe of blue pubescence, curving forwards, and then recurving under the wings; the basal joint of all the tarsi above, the anterior and intermediate tibiæ above, and a spot at the base of the posterior tibiæ, of blue pubescence. The scutellum slightly rounded at the sides, and deeply notched behind. The first segment of the abdomen has a transverse fascia at its base, and another a little before its apical margin, united to each other at the sides; the four following segments have a central fascia, very slightly interrupted in the middle, of blue pubescence; the anterior wings dark fuscous, having the externo- and interno-medial cells, the first discoidal, and a spot in the first submarginal cell, hyaline. The entire insect deeply punctured.

The only species of the genus, which closely resembles this, is one which comes plentifully from Africa, but that species may at once be recognized as distinct, by its being delicately punctured, and the pubescence of a much paler colour.

Xylocopa appendiculata.

Female.—Black; the antennæ slightly piceous beneath; the thorax, above and on the sides, clothed with bright yellow pubescence; the wings fuscous, darkest towards their apical margins, and having a bright prismatic reflection; the abdomen punctured, and fringed at the apex with black hair.

Male.—Black; the clypeus, the scape of the antennæ in front, and the apical joints beneath, yellowish white; the thorax, above

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and on the sides, clothed with bright yellow pubescence; wings as in the female; the anterior tarsi fringed with fulvous hair; the posterior tibiæ have at their apex a somewhat oblong projecting appendage. The abdomen punctured, the basal segment clothed with bright yellow pubescence; the apex fringed with long black hairs.

Hab. near Ning-po-foo.

Xylocopa rufipes.

Female.—Black; the apical joints of the antennæ piceous beneath, the head nearly as wide as the thorax; the thorax above clothed with fuscous pubescence; on the metathorax and on the sides it is pale ochraceous, as it is also on the basal, and basal half of the second segment of the abdomen; the wings fusco-hyaline, and having a dark cloud on their apical margins; the intermediate and posterior tarsi, and the apex of the posterior tibiæ, densely clothed with fulvous pubescence; the sides of the abdomen towards its apex fringed with pubescence of the same colour, as are also the margins of the abdominal segments beneath.

Xylocopa pictifrons.

Female.—Black; the head as wide as the thorax, the pubescence very short, and thinly scattered; the upper margin of the clypeus smooth and shining, a deep depression on each of its lateral margins; the disk of the thorax very smooth and shining, sparingly punctured; the wings fuscous, having a bright iridescent coppery reflection, the anterior pair have their medial and discoidal cells transparent; legs entirely black; the posterior tarsi furnished with a dense brush of black hair. Abdomen elongate, its disk sparingly punctured, its sides densely so; thickly pubescent at the sides.

Length 10 lines.

Male.—Black; clothed entirely with fulvous pubescence; the face has two broad yellow stripes extending from the vertex to the base of the mandibles, the intermediate portion below the antennæ clothed with black hair. The wings sub-hyaline, slightly clouded towards their apical margins; the tarsi within are clothed with ferruginous pubescence. Abdomen, down the centre the pubescence is less dense, giving it the appearance of an obscure black line.

Length 9 lines.

Hab. Chusan.

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Bombus tunicatus. (Tab. VIII. fig. 7.)

Female.—Head black; thorax clothed with white pubescence, and having a black transverse band between the wings, which are dark fuscous; the two basal segments of the abdomen have white, the third black, and the rest of the apical segments bright fulvous pubescence; the legs entirely black, as well as the body beneath.

Length 10 lines.

Worker.—This sex differs in having a broader black band on the thorax, in having only the basal segment white, the second being in this sex fulvous; otherwise as the female.

Length 6 to 8 lines.

Hab. Chusan, on the top of hills.

The workers only were brought by Mr. Fortune from North China, but specimens of these, and also of females, are in the Museum Collection from northern India. It is one of the most beautiful species of the genus.

Mr. Fortune informed me that all the *Bombi* were found on the top of hills in Chusan, and adjoining main land.

Bombus hæmorrhoidalis.

Female.—Black; the head and thorax clothed with black pubescence; the wings dark brown; the two basal segments of the abdomen clothed with bright yellow pubescence, the rest of the segments with bright fulvous red.

Length 11 lines.

Worker.—Differs only in size. (8 to 9 lines.)

Male.—The head and thorax clothed with long sooty-black pubescence; the antennæ as long as the head and thorax; the pubescence on the legs is long sooty-black, intermixed with pale hairs; the legs are elongate, their tarsi ferruginous. Abdomen, the two basal segments clothed with bright yellow, the rest with bright fulvous pubescence.

Length 8 lines.

Hab. Chusan, on the hills.

In the British Museum there are specimens of this species from northern India.

Bombus trifasciatus. (Tab. VIII. fig. 4.)

Female.—Black; the head clothed with black pubescence, the thorax with yellow, the legs with black, their tarsi ferruginous. Abdomen, the two basal segments clothed with yellow pubes-

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cence, the third and fourth with black, and the apical one with bright fulvous.

Length 10 lines.

Worker.—Resembles the female.

Length 7 lines.

Hab. Chusan.

I have not seen this species from any other locality.

Bombus atripes. (Tab. VIII. fig. 3.)

Worker.—The head entirely black; the thorax above clothed with fulvous pubescence, the wings dark fuscous, the legs entirely black. Abdomen clothed above with a deep, rich, fulvous pubescence.

Length 9 lines.

Male.—This sex exactly corresponds with the worker in colouring.

Length 9 lines.

From the fact of the two sexes corresponding in size, I take them to be male and worker. The male *Bombi* are usually considerably smaller than the females.

Hab. Chusan.

Bombus nasutus.

Worker.—Head one-third longer than broad, entirely black, except a few yellow hairs on the vertex; the thorax clothed with ochraceous pubescence, as well as the two basal segments of the abdomen; the wings dark fuscous, the legs entirely black; the body beneath black.

Length 6 to 9 lines.

Hab. Chusan.

Bombus breviceps.

Worker.—Head entirely black, as broad as long; the thorax clothed with bright fulvous pubescence, and the two basal segments of the abdomen with bright golden yellow; the rest of the abdomen with black; the wings dark fuscous; legs and body beneath black.

Length 9 lines.

Hab. Chusan.

There is considerable general resemblance between this species and *nasutus*, and probably in faded specimens it would be still greater, but the form of the head is decisive of their difference.

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Bombus flavescens.

Male.—Entirely clothed with pale yellow pubescens; the wings hyaline, their apical margins clouded; the legs testaceous red.

Length 8 lines.

Hab. Chusan.

This species is at present unique in the collection of the British Museum.

IX. *Descriptions of some Hymenopterous Insects from Northern India.* *By* F. Smith, Esq.

[Read 5th July, 1852.]

As an appendix to my descriptions of Chinese *Hymenoptera*, read 3rd May, I beg to present the following descriptions of Indian Wasps and Bees.

Vespa magnifica.

Female.—Black; head and basal joint of the antennæ of an orange-yellow; the mandibles are darker than the head, and have their teeth black; the head is finely and the clypeus coarsely punctured; the prothorax laterally is indistinctly tinged with red; there is also on each side of the mesothorax anteriorly a very obscure spot of the same colour, and another on the outer margin of the tegulæ; the wings fuscous; the anterior tibiæ in front have more or less of a ferruginous colouring, and the entire legs have a changeable sericeous pile. Abdomen, the segments one to five have a narrow orange-yellow marginal fascia, continued beneath; that on the fifth sometimes interrupted above; the sixth entirely yellow; the entire abdomen covered with a beautiful bloom.

Length 21 lines to 2 inches.

The *Worker* is similarly coloured, having the claws and anterior tibiæ and knees orange-yellow; the bands on the abdomen not quite so entire.

Length 12—14 lines.

Hab. Nepaul.

The specimens of this fine species, which are in the collection of the British Museum, were obtained from Major General Hardwick's collection.

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Vespa auraria. (Tab. VIII. fig. 8.)

Female.—Orange-yellow; the head has some black pubescence on the vertex, and the mandibles have their teeth black; the thorax beneath is black; the mesothorax fuscous, and having a broad central stripe reddish yellow, the scutellum, and a lateral spot beneath, of the same colour; the tegulæ have a fuscous spot in the centre; wings hyaline, their anterior margins somewhat ferruginous towards their base; the anterior femora in front towards their base, the coxæ behind, and the intermediate and posterior coxæ and femora, black; the intermediate tibiæ, except their apex outwardly, the posterior pair in front and a spot towards their apex within, black; the entire legs being covered with a reflecting golden pile. The basal half of the first segment of the abdomen, and rather more than the basal half of the second, are rufo-fuscous; the basal segment has its apical margin narrowly pale-yellow; and the fuscous band on the second segment is slightly produced laterally; beneath, the segments are laterally more or less bright pale-yellow; the entire abdomen has a brilliant golden reflection.

Hab. Northern India.

This beautiful species is in several collections; but I am only acquainted with the six described.

Vespa basalis.

Female.—Black; the head, antennæ and mandibles, ferruginous, the latter black at their tips; the prothorax, tegulæ, a spot beneath the wings, a square spot on the mesothorax posteriorly, the scutellum and post-scutellum, and the sides of the metathorax, more or less ferruginous; the wings have a fuscous cloud on their anterior margins occupying the externo-medial cell; the margins of the coxæ and trochanters, the knees, the tibiæ and tarsi, ferruginous; the legs entirely covered with shining yellow or ochraceous pubescence. The basal segment of the abdomen has a transverse ferruginous macula forked at each end, and the apical margin has a narrow yellow band; the rest black. The entire insect is covered with a short thick pubescence, which somewhat obscures the colouring.

Hab. Nepaul.

There are two specimens of this species in the collection at the British Museum. I have not seen any other.

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Vespa obliterata.

Female.—Black; head ferruginous; the eyes and teeth of the mandibles black; the prothorax, a spot on the mesothorax touching the scutellum, the scutellum, post-scutellum, the space between them, the base of the wings, the tegulæ, and a spot beneath the wings, reddish-yellow; the legs are of the same colour; the coxæ, intermediate and posterior femora, except the apex of each, black; the apical joints of the tarsi fuscous. Abdomen black; the apical margin of the basal segment narrowly piceous; the entire insect densely covered with pubescence, that on the head and thorax being yellow, but that on the abdomen black.

Hab. Northern India.

I have only seen one specimen of this very distinct species; it is in the cabinet of J. S. Baly, Esq., who obtained it from Captain Boys' collection.

Bombus eximius. (Tab. VIII. fig. 5.)

Female.—Black; head, thorax and abdomen clothed with black pubescence; the tegulæ nigro-piceous; wings hyaline, with a ferruginous tinge towards their base; the nervures ferruginous; the intermediate and posterior tibiæ, and tarsi, ferruginous, and clothed with ferruginous pubescence, as well as the anterior tarsi beneath.

Length 14 lines.

Hab. Silhet.

In the British Museum there are specimens of this fine species. I have not seen it in any other collection.

Bombus funerarius. (Tab. VIII. fig. 6.)

Female.—Black; the clypeus very smooth and shining, its anterior margin ferruginous; the mandibles also ferruginous, having two longitudinal deep sulcations, their apex rounded; the face has a little black pubescence above the clypeus and also along the vertex, intermixed with a little silvery grey; the thorax above, and the basal segment, clothed with silvery grey pubescence, very dense and shining; the thorax beneath, the coxæ, trochanters, and femora, clothed with long silvery hairs; the apical joints of the tarsi ferruginous, claws black; the three apical segments of the abdomen clothed with silvery pubescence, the extreme apex intermixed with fulvous, particularly beneath; the wings fusco-hyaline.

Length 9 lines.

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Hab. Northern India. From Captain Boys' collection.

The only specimen which I have seen of this beautiful insect is in the collection at the British Museum.

Bombus rufo-fasciatus.

Female.—Head black; the thorax black, with a transverse band of silvery-white pubescence on the collar, and another on the metathorax; the basal segment of the abdomen clothed with white pubescence, the second with black, the third with bright fulvous-red, and the three following with white; the wings hyaline; the thorax beneath, and the legs, clothed with black pubescence; towards the apex of the abdomen beneath there is a little white pubescence.

Length 10 lines.

Hab. Northern India.

I have only seen two specimens of this beautiful *Bombus;* one is in the collection of the British Museum, the other in that of J. S. Baly, Esq.

Bombus simillimis.

Female.—Entirely black, except the three apical segments of the abdomen, which are red; in some specimens there is a little pale pubescence on the basal segment of the abdomen; the wings dark fuscous, semi-transparent.

This species is very like the *Lapidarius* of Linn.; it is, however, larger, and has dark wings.

Hab. Northern India.

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X. *On the Habits of the Species of the Coleopterous Genus* Megacephala, *inhabiting the Amazonian Region of South America. By* H. W. Bates, Esq., *with a Synopsis of the Species by* J. O. Westwood, Esq., F.L.S., *&c.*

[Read 7th June, 1852.]

Throughout the whole country, from the city of Para to Ega, on the upper Amazons, I have found eleven species of the genus *Megacephala*. They are all inhabitants of sandy soils in exposed situations, none being found in the shades of the humid forests which cover nearly the whole surface of the country. I believe they are all nocturnal in their habits, except perhaps the *M. sepulchralis*, Fab., in the daytime being concealed several inches deep in burrows in the sand. I have never observed any one make use of its wings, which the *Cicindelæ* and *Odontocheilæ* so readily do, but their powers of running exceed anything I have ever observed in this style of insect locomotion; they run in a serpentine course over the smooth sand, and when closely pursued by the hand, in endeavouring to seize them, they are apt to turn suddenly back, and thus baffle the most practised hand and eye. Nearly all the species are confined to the margins of the river, on the sandy beaches and extensive sand banks in mid-river; and are found chiefly in the dry season, most abundant when the sinking waters have left exposed the largest extent of sand. The pallid-coloured series of species, of which I have observed five, are quite confined to the most extensive of the sandy beaches, where the sand is finest and whitest, which begin only at the altitude of Santarem. In their pale colours, with dusky marks or patches on the elytra, they resemble the *Nebria complanata* of the sandy sea shores of Europe, which has a similar aspect and habits, and in taking these *Megacephalæ* I have been forcibly reminded of the *Nebriæ*, their colours respectively agreeing with those of the locale they inhabit. There is another instance of the same relation here, in a large species of *Forficula*, of the same pallid colours, and found also on these sandy shores. There are, throughout the various branches of Zoology, many instances of this relation between the colours of species and the locale they inhabit, and all such facts, when observed, appear to me deserving of record, although it may be far in the future of the history of science before any useful generalization be drawn from them.

The *Megacephalæ* are closely allied to the *Cicindelæ*, and the

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two genera are naturally placed in close vicinity in the same group of genera of *Cicindelides*. Relatively to the *Cicindelæ*, the former have a body more robust, a broader and stronger head and thorax, with, consequently, stronger mandibles, showing a habit of preying upon larger subjects, and greater force in tearing their food; their antennæ are longer and more tapering, showing probably an acuter sense, whatever that sense may be which resides in those organs. Lastly, their legs are much more robust, agreeing with their terrestrial habits. They may be defined shortly as robust, terrestrial (cursorial), and nocturnal *Cicindelidæ*.

The larvæ of *Megacephalæ* inhabit the same sandy districts as the perfect insects, in cylindrical burrows, where they lie in wait for prey. I have taken two or three species, none of which differ in any essential particular from the descriptions of the larva of *Cicindelæ*. The head is broad, semicircular, concave above and concave-convex beneath, with the mandibles curved upwards, so as to be able to seize anything falling on the concave upper surface of the head. They are so rapacious or irascible, seizing anything that disturbs them, that they are readily taken by inserting a straw in their burrows, which they seize instantly and retain with pertinacity.

Of the eleven species which I have taken, five are of the pale-coloured series; five of the brilliant-metallic species, copper-coloured green or blue, all with an ovate pale spot at the apex of the elytra; and one is obscure black. The last-mentioned (*M. sepulchralis*, F.) is different in its habits, as well as in its colour and form, from the other two groups. It is found in dry gravelly places, in open grassy spaces in the forest, running rather slowly about the roots of grass in the daytime. I have taken it only at the Barra of the Rio Negro, where the country is dry and undulating, and the forest somewhat low and thinned. The largest of the pale species, about an inch long, is the robust *M. testudinea*, which I took in company with three other species of the genus on the sandy shores of the Teffé at Ega, at night. One small, smooth, pale species (*M. laminata*, Perty), having a diamond-shaped dusky spot over the suture of the elytra, I have found on all the more extensive sandy beaches, more or less sparingly, from Carefé, near Parà, to Ega. One pale, nearly spotless species (*M. cruciata*), 9 lines long, I took only at the Barra, whence I sent a small series to England. Another nearly resembling this (*M. bifasciata*, Brullé) I have taken more abundantly at Ega and at Santarem. A fifth species (*M. asperula*), small, and covered with elevated granulations, I took only two specimens of, on the sand islands in mid-river, on the Upper Amazons. In the

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metallic coloured group one species (the beautiful *M. Spixii*) I found rather abundantly at Villa Nova, on the light earthy or sandy margins of the river, where the fluctuating level of the waters leaves a succession of terraces. By cutting away the edges of these terraces I was able to get at their burrows readily, and took as many as I wanted. Another copper-coloured, very handsome species, more robust in form (*M. curta*, Reiche), is found at the moist edges of the water, under stones and sediment. Of one fine green species (*M. spinosa?*), distinguished by a small tooth at the sutural angle of the apex of the elytra, I, at present, have only a single specimen from the extensive sandy campos of Santarem. The fourth species, which is elongated in form, of a fine uniform blue or blue green colour (*M. Martii*), I have found also at Santarem, very circumscribed in its localities; it prefers dry gravelly situations, and is only seen after sunset. The fifth and last species is the smallest of the metallic group, having the elytra much narrowed towards the apex (*M. quadricollis*, Laf.). I have met with it only at Ega, in company with *M. testudinea* and two other pale species. H. W. B.

List of the Species mentioned in the preceding Memoir.

A. Black species (*Aniara*, Hope).

Sp. 1. *Megacephala sepulchralis*, Fabricius, Syst. Eleuth. p. 233, n. 9 (*Cicindelas*), Dej. Sp. Gen. v. 199, n. 7.
Meg. variolosa, Dej. Sp. Gen. i. 14, n. 7.

B. Pale coloured species. (*Ammosia*, Westw.)

Sp. 2. *Megacephala testudinea*, Klug, Jahrbucher D. Ins. p. 6, pl. 1, f. 2.
M. Klugii, Moritz, MS.

Mr. Bates' specimens of this species are chestnut red on the upper side, without any gloss, and with paler lateral margins and luteous buff beneath. The head is smooth above, except between the eyes, where it is finely striolated, the striolæ of the disc being almost obsolete, the inner margin of the eyes black. The labrum is transverse, pale luteous, the lateral angles rather porrected and rounded, the centre porrected and armed with two obtuse black teeth; half-way between the produced middle and the lateral angles is another small tooth on each side; the mandibles are pale luteous, with black teeth, the right one in the male having the second tooth from the tip very minute, and the third oblique emarginate at its tip, whilst in the female it has three large terminal

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teeth, and the left one in both sexes has the first and third large, with a small one between them; the labial palpi are remarkably long, the antennæ pale luteous, with the first four joints more or less marked with black on the upper side. The pronotum is nearly smooth above, with two transverse punctured impressions, the ordinary longitudinal one only slightly impressed, the portion behind the second transverse impression is black. The elytra are broader behind the middle, and covered with extremely numerous and very minute conical granulations, those of the disc being the largest, the points of which are directed backwards; at about one-third of the width of the elytra, on each side of the suture, is an irregular row of deeper punctures, forming an indistinct longitudinally impressed striola on each elytron; beyond the middle, and towards the side, is a somewhat oval black spot, its inner margin oblique, and produced behind into a small, slender, curved mark, directed towards the suture, beyond which the elytra are pale luteous, as well as at the sides. The whole of the underside of the body, palpi and legs are luteous, the four posterior femora having a black spot near the tip on the upper side.

Long. corp. ♀ lin. $1\frac{1}{12}$.

Having no typical specimen of *M. testudinea* for comparison, it is not possible to decide with certainty whether Mr. Bates' specimens are specifically distinct from that species, several of the characters mentioned above being omitted in Dr. Klug's description.

Sp. 3. *Megacephala laminata*, Perty, Del. An. art. Bras. 1, p. 2, pl. 1, f. 3.
M. nocturna, Klug, MS., Dej., Sp. Gen. v. p. 203.

Sp. 4. *Megacephala bifasciata*, Brullé in D'Orbigny, Voy. Amer. merid. VI. ii. p. 1, pl. 1, f. 1.
M. æquinoxialis, Fabr., Dej., &c., but not of Linnæus, which = *Brachinus complanatus*, F.

Dr. Erichson, Jahrbucher Entomol. 1837, n. 209, considers that the name *M. æquinoxialis* should, however, be retained, as having been used by Fabricius in a genus far removed from *Brachinus*; but it is quite evident, from the words of Fabricius, Syst. Eleuth. i. p. 243, n. 60, "Species mihi obscura," that he had never seen it, but had merely taken it up from the writings of Linnæus.

According to M. D'Orbigny this species rests, during the day, at the bottom of holes, which it burrows in the margins of rivers, coming abroad only on the approach of night, and running with extreme velocity.

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Sp. 5. *M. cruciata*, Brullé in D'Orbigny, Voy. Amer. merid. VI. ii. p. 2, pl. 1, f. 2.

Depressa, flavo-rufa, subtus pallidior; ore, antennis pedibusque flavis; elytrorum vitta suturali fasciaque fuscis. Mas. Long. 7½, lin.

Northern part of Corrientes, on a sand bank at Parana.

One-fourth smaller than *M. bifasciata*, with the elytra very strongly punctured, and without the black band between the eyes; the denticulations of the labrum are also more porrected. It runs with very great agility, and "semble plutôt voler que marcher."

Messrs. Tatum and S. Stevens regard this supposed species as a very pale variety of the preceding, which, indeed, greatly differs, in the extent of its markings, some specimens having the disc of the elytra almost entirely black. Mr. Bates' capture of specimens in a single locality, apart from that which afforded the true *M. bifasciata*, is in favour of their specific distinction.

Sp. 6. *M. asperula*, Westwood.* (Tab. VII. f. 8.)

Testaceo-lutea; antennis, palpis et pedibus albidis; capite in medio fusco, elytrorum sutura late, fasciaque utrinque abbreviata pone medium fuscis, pronoto antice et postice elytrisque undique granulato-asperulis, his brevibus latis obovatis.

Long. corp. lin. 5.

Syn. *M. brevis* and *M. brevipennis*, —— MS. in museis.

* Obs.—The five species above mentioned are the only ones hitherto known belonging to the pallid division of the genus. I therefore take this opportunity of describing another new species, from the collection of T. Tatum, Esq., who received it from the Jardin des Plantes, without any indication of its locality.

Megacephala Oxycheiloides, Blanchard, MS.
M. nigricollis, Reiche.

M. nigra, haud nitida, depressa; capite antice, antennis, pedibus, elytris utrinque macula magna triangulari laterali, alterisque duabus apicalibus albidis ♀. Long. corp. lin. 8½.

Præcedentibus magis depressa coloreque nigro corporis, capitis et pronoti distincta. Caput subquadratum, oculis prominulis, vertice planiusculo sub lente striatulo, macula antica semicirculari albida. Labrum transversum, albidum, medio antice valde porrectum, denticulis duobus centralibus acutis alterisque duobus lateralibus, dentibus apice castaneis. Mandibulæ albidæ, dextera dentibus tribus validis apicalibus, sinistra tribus intermedio parvo. Palpi albidi, labiales articulo penultimo valde setoso, ultimo paullo securiformi. Pronotum truncato-cordatum, subdepressum, impressionibus duabus transversis ordinariis fere obsoletis, media longitudinali tenui, disci medio lævi, antice et postice sub lente tenuissime coriaceo. Elytra suboblonga, depressa, fere parallela, depressa, disco undique granulis minutis conicis (apicibus postice directis); nigra, singulo macula magna laterali irregulariter triangulari, suturam haud attingente, e basi ad medium lateraliter extensa, alteraque subovali apicali. Corpus infra nigrum, læve, subnitidum; apice segmenti apicalis abdominis albido. Pedes omnino albidi.

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M. laminatæ magnitudine et forma proxima, differt imprimis pronoto et elytris aspero-granulatis, granulis nigris. Caput breve, pronoto latius, fere læve, disco parum convexo in medio fusco, margine interno oculorum tenue nigro. Labrum luteo-albidum, angulis lateralibus rotundatis, margine antice denticulis 4 minutis æqualibus et æquidistantibus. Mandibulæ albidæ, dentibus apice castaneis, dextera dentibus tribus validis, sinistra etiam tribus intermedio parvo. Palpi albidi, maxillares articulo 2ndo parum inflato. Antennæ graciles, albidæ, articulis 2do, 3tio, et 4to supra fusco parum tinctis. Pronotum lateribus antice fere rectis, pone medium sensim angustatis; disco convexo, impressionibus binis ordinariis transversis indistinctis, media longitudinali tenui sat distincta, antice et postice granulato. Elytra brevia, obovata, albido-lutea, undique granulis minutis nigris aspera, cruce fusca reversa notata apice crucis acuminato, apice suturæ albido relicto; margine tenuissimo laterali fusco. Pedes graciles, albidi. Corpus infra fusco-luteum, abdominis apice pallidiori.

Obs.—The specific names attached to this insect in several collections, without any author's name attached, are equally applicable to *M. laminata*, whilst the remarkably granulated surface of the elytra suggests a name at once indicative of the species.

C. Metallic coloured species. (*Tetracha*, Westw.)

Sp. 7. *Megacephala Spixii*, Brullé in D'Orbigny, Voy. Amer. merid. VI. ii. p. 3, pl. 1, fig. 3. (Tab. VII. fig. 5.)

Obs.—Dr. Erichson, Jahrb. Entomol. 1837, p. 209, considers this as not distinct from *M. Martii*, to which indeed it is very closely allied in form, sculpture and colour of the limbs. The observations, however, of an intelligent collector like Mr. Bates upon these insects in their native country, warrants their retention as distinct.

Sp. 8. *Megacephala Martii*, Perty, Delect. An. Art. Bras. p. i. pl. 1, fig. 1. (Tab. VII. fig. 3.)

Sp. 9. *Megacephala curta*, Reiche? MS. (Tab. VII. fig. 1.)

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M. capite, pronoto et elytrorum disco læte purpureo-cupreis, horum lateribus cyaneis, apice singuli macula elongato-ovali lutea notatis; pedibus luteis, geniculis posticis nigris.
Long. corp. lin. 8.

Affinis *M. geniculatæ*, Chevrolat, et *M. Chiliensi*, Laporte. Caput læte cupreo-purpureum, antice et lateraliter viridi-tinctum, vertice sub lente tenuissime striolato et areolato, punctis duobus parvis ad marginem internum oculorum, impressionibusque duabus minus profundis inter partem anticam oculorum. Labrum, mandibulæ et antennæ lutescentes, illarum dentibus nigris, harum articulis 4 basalibus supra fusco-notatis. Pronotum valde convexum, lævissimum, colore capiti simile, impressionibus ordinariis profundis. Elytra quam in *M. Martii* breviora et magis ovata, disco antice coloris capitis et pronoti, hoc colore ultra medium suturæ extenso at sensim angustato; lateribus elytrorum cyaneis viridi-tinctis, maculaque elongato-ovali lutea, ad apicem costæ angustius producta, disco punctatissimo. Corpus infra nigrum, coloribus metallicis tinctum. Pedes lutescentes, femoribus 4 posticis prope apicem supra fusco-tinctis.

Obs.—I cannot distinguish this species from the insect in the British Museum collection with the name of *Meg. remota*, Reiche, MS. attached to it.

Sp. 10. *Megacephala* —— ?

Obs.—Mr. Bates' unique specimen of this insect has not yet reached this country, but from his notes it is most probably either *M. spinosa*, Brullé in Voy. D'Orbigny, Amer. merid. VI. ii. p. 3, n. 7, or *M. acutipennis*, Dejean, Sp. Gen. i. p. 13, n. 6.

Sp. 11. *Megacephala quadricollis*, Laferte? MS. (Tab. VII. fig. 7.)

M. prothorace subquadrato, elytrisque ad apicem spinosis; supra viridis; elytrorum lateribus postice luteo-albidis; ore, antennis pedibusque luteo-albidis.
Long. corp. lin. 6½.

Species parva, forma prothoracis et elytrorum spinisque apices horum armantibus primo intuitu distinctissima. Caput supra cupreo-viride, vertice subconvexo, sublævi, prope marginem internum oculorum longitudinaliter striatulo, impressionibus

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inter partem anticam oculorum obsoletis. Labrum transversum, lutescens, fusco tenuissime marginatum, denticulis duobus mediis parum prominentibus. Mandibulæ et antennæ lutescentes, illarum dentibus nigris, harum articulis 4 basalibus supra fusco-notatis. Prothorax subquadratus, capite paullo angustior, postice vix angustior, lateribus fere rectis, sulco profundo angusto sinuato antico, alteroque recto postico transversis; lineaque media ordinaria profunde impressa; dorso lævi, cupreo-viridi, lateribus sulcoque antico tenuissime punctatis, parte postica pone sulcum posticum irregulariter granulata. Elytra elongato-ovalia, disco granulis conicis minutis scabro, cupreo-viridia, singulo macula elongata laterali lutescenti postica, ad apicem suturæ extensa, singuloque in spinam acutam sensim desinente. Corpus infra viride, abdomine lutescente. Pedes lutescentes, femoribus 4 posticis ante apicem fusco-nebulosis.

The following is a tabular classification of the species of *Megacephala*, showing the position of the subgenera indicated above, founded for the most part on the variations in the dentition of the mandibles. This is a character which has been generally overlooked by Entomologists, although the use made of it in the higher branches of zoology show its great value. It is true indeed that in most modern generic descriptions the form of the mandible is given, but this is drawn almost universally from the inspection and figure of a single jaw, whilst the comparative form of the two mandibles, and the mode in which their combined action modifies the form and position of their relative toothing, is generally neglected. The genus *Megacephala* was first divided by Serville and St. Fargeau, in the Encyclopédie Méthodique, into two sections, from the wingless and winged condition of the species, the name of *Aptema* being given to the former group, the type of which was however that of the genus *Megacephala*, whilst a second species was added (*M. 4-signata*), which is certainly winged. Mr. Hope, in the second part of his Coleopterist's Manual (p. 6), restored the generic name *Megacephala* to the type *M. Senegalensis*, dividing it into two sections, 1st, that containing the type, destitute of wings, and, 2nd, that containing *M. 4-signata* and *Euphratica*, both of which are winged, adding two new genera, *Tetracha*, Westw., containing *Cic. Carolina*, Linn., and its allies, natives of the New World, having the mandibles armed with four apical teeth, and *Anaira*, the type of which is *M. sepulchralis*. A nearly similar arrangement was adopted by M. Lacordaire in his revision

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of the family published in the first volume of the Memoirs of the Natural History Society of Liège. A careful examination of the characters of the *Megacephalæ* has convinced me that a more extensive division is requisite; in other words, that the characters employed to separate *Tetracha* and *Anaira* will render the establishment of several other sections necessary when applied to the Old World as well as to the pale species of the New World.

MEGACEPHALA.

A. Elytra humeris rotundatis, haud angulato-prominentibus.

* Corpus apterum, subcylindricum. Mandibulæ dentibus acutis. Color viridi-metallicus, elytris totis concoloribus. (*Aptema*, Serv. and St. Farg.) Type *M. Senegalensis*, Latr., Dej.; *Cic. megalocephala*, Fabr. (Senegal.)

** Corpus alatum, latius, subdepressum.

a. Mandibulæ dentibus intermediis oblique truncatis. Color metallicus, elytris ad apicem macula lutea notatis. Types *M. 4-signata*, Dej. (Senegal); *M. Bocandei*, Guérin-Méneville, Rev. Zool. (Congo.)

b. Mandibulæ dentibus intermediis acutis, sinistra dente 2ndo (apice acuto mandibulæ pro dente 1mo computato) parvo vel 3tio minori. Color luteus. (*Ammosia*, Westw.) Type *M. bifasciata*, Brullé (*Æquinoctialis*, Dej.) (Amer. merid.)

B. Elytra humeris angulato-prominentibus.

* Mandibula recta, dentibus tribus apicalibus armata (dente basali composito denticuloque ejus supero haud computatis).

† Mandibula sinistra dente 2ndo minuto. Color metallicus, elytrorum apice macula lutea notato. Type *M. Euphratica*, Oliv., Dej. (Persia, India, Spain, Barbary.)

†† Mandibula sinistra dente 3tio fere obsoleto. Color totus niger. (*Anaira*, Hope.) Type *M. sepulchralis*, Fabr., Dej. Sp. Gen. v. 199 (*M. variolosa*, Dej. Sp. Gen. i. p. 14) (Amer. merid.)

** Mandibula recta dentibus quatuor apicalibus armata. Color metallicus, elytris macula lutea apicali notatis.*

* Obs.—The pale apical spot of the elytra is wanting in *M. virginica*, Fab., *M. femoralis*, Perty—and a few others.

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† Mandibula sinistra dente 2do minuto. Labrum denticulatum. Type *M. Australasia*, Hope. (Port Essington, New Holl.)

Proc. Ent. Soc. Nov. 1841 ; Annals of Nat. Hist. ix. 425 ; White, in Append. to Stokes' Voy. Ins. pl. 1, fig. 1.

†† Mandibula sinistra dente 2ndo 3tio majori vel æquali. (*Tetracha*, Westw. Hope). Type *Cic. Carolina*, Linn. &c. (Amer. merid.)

J. O. W.

DESCRIPTION OF PLATE VII.

Figure 1. *Megacephala curta.*
2. Larva of *M. curta* ?
3. *Megacephala Martii.*
4. Larva of *M. Martii* ?
5. *Megacephala Spixii.*
6. Larva of *M.* —— ?
7. *Megacephala quadricollis.*
8. *Megacephala asperula.*
2 *a*. Head of larva of *M. curta* ? profile.
6 *a*. Dorsal segment showing the hooks.
6 *b*. Profile of do.

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XI. *On the Lamellicorn Beetles which possess exserted Mandibles and Labrum, and 10-jointed Antennæ. Being a Supplement to a Memoir published in the Fourth Volume of the Transactions of the Entomological Society.* By J. O. Westwood, Esq., F.L.S., &c.

[Read 7th June, 1852.]

During the ten years which have elapsed since my paper upon those genera of Lamellicorn beetles which agree in possessing exserted mandibles and labrum, and 10-jointed antennæ, was presented to the Entomological Society, I have neglected no opportunity of searching for any additional allied types of form not contained in that communication, and have now the pleasure of laying before the Society descriptions and figures of several new genera and species by way of supplement to my former memoir.

With respect to the distribution of the Lamellicorn insects into families, a highly important modification of the views of Latreille and MacLeay has been published by the late Dr. Erichson, in his work upon the *Coleoptera* of Germany (Naturgeschichte der Insecten Deutschlands, pp. 563, 717). We here find the *Lamellicornia* (including the *Lucanidæ*) divided into two primary groups. The first (corresponding with MacLeay's *Thalerophaga*, with the addition of the *Dynastidæ* and the exclusion of the *Glaphyridæ*) named

Scarabæides pleurosticti.

(*Ligula* mento connata. *Spiracula abdominalia* 2—6 in segmentorum ventralium parte dorsali sita, septimum liberum. *Segmentum penultimum* dorsale ventraleque connata. *Larvæ* maxillarum malis connatis)—

And containing the families *Dynastidæ*, *Cetoniidæ*, *Rutelidæ*, and *Melolonthidæ* (with the *Anoplognathidæ*).

The second primary division is named

Scarabæides laparosticti.

(*Ligula* a mento discreta. Spiracula abdominalia inter segmenta ventralia dorsaliaque sita, omnia ab elytris obtecta. *Larvæ* maxillarum malis discretis.)

It will be at once perceived that the three characters upon which these divisions are founded involve important physiological

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considerations, and are therefore entitled to more weight than merely artificial characters,—such as the number of joints in the antennæ or the number of spines on the tibiæ. The separation or junction of the ligula (or labium) with the mentum of the perfect insect, as well as the separate or connate condition of the lobes of the maxillæ of the larvæ, are of course intimately connected with the nature of the food of the insect, whilst the position of the spiracles of the abdomen in the imago intimates corresponding variations in the nature of the residence or relative exposure to the air of the perfect insect.

The *Scarabæides laparosticti* are divided into two groups, corresponding with the remaining families of the Linnæan *Scarabæi* and the Linnæan *Lucani*.*

The following is Erichson's plan of distribution of the Scarabæideous portion of the *Laparosticti*:—

A. Abdomen with six ventral semisegments.

a. Epimera of the metathorax free.

I. Glaphyridæ. *Epimera* metathoracis libera. *Antennæ* 10 vel 9 articulatæ. *Abdomen* segmentis ventralibus 6 liberis.

Genera *Glaphyrus*, *Amphicoma*, &c., with *Aclopus*, Er., and the remarkable Australian genus *Phænognatha* of Hope, described and figured in the fourth volume of our Transactions, p. 113, pl. VI. fig. 5, as forming a natural transition to the *Hybosoridæ*.†

II. Hybosoridæ. Die fühler 10-gliedrig. Die bauch-halbringe mit Ausnahme des letzten, mit einander fast verwachsen.

Genera 1. *Hybosorus*, MacLeay.

2. *Silphodes*, Westw., Trans. Ent. Soc. iv. 160; *Atimus*, Dej.; *Phæochrus*, Lap.‡

3. *Coilodes*, Westw. Trans. Ent. Soc. iv. 163.§

4. *Dicraeodon*, Erichson;|| *Chætodus basalis*, Westw. Trans. Ent. Soc. iv. 166.

* Notwithstanding the relations involved in the employment of Erichson's primary characters, I cannot but think that the views of Linnæus and Latreille, in dividing the Lamellicorns into two groups, *Scarabæus* and *Lucanus*, are to be preferred to those of Erichson.

† *Phænognatha* appears to me to be much more nearly related to *Pachypus*, which Dr. Erichson places in the family *Melolonthidæ*.

‡ Erichson adopts Laporte's name for this genus. The names however of genera, so slovenly characterized as not to be recognizable, are no better than MS. or catalogue names, and must give way to names attached to correct detailed descriptions and full accompanying figures.

§ Erichson hypercritically has altered this name to *Coelodes*.

|| The type of this genus is the insect which I described under the name of

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5. *Apalonychus*,* Westw. Trans. Ent. Soc. iv. 168 (*Trichops*, Dej. Cat.).

III. Geotrupini. *Epimera* metathoracis libera. *Antennæ* 11-articulatæ. *Abdomen* segmentis ventralibus 6.

Genera *Geotrupes*, *Lethrus*, *Odontæus*, *Bolboceras*, *Athyreus*.

Obs.—Ample details of the generic structure of the last three genera are given in the plates illustrating my three papers on the *Athyrei* and *Bolbocerata* in the twentieth and twenty-first volumes of the Linnæan Transactions. Monographs of the genera *Athyreus* and *Bolboceras* have also been published by Dr. Klug in the Nova Acta.

β. Epimera of the metathorax concealed.

IV. Coprides. *Antennæ* 9 vel 8-articulatæ. *Abdomen* segmentis ventralibus sex connatis. *Tibiæ* posticæ calcare singulo.

V. Aphodiidæ. *Antennæ* 9-articulatæ. *Abdomen* segmentis ventralibus 6 liberis. *Tibiæ* posticæ spinis terminalibus binis.

Obs.—The genera *Euparia*, *Ægialia*, *Chiron*, *Ryparus*, Dej., *Corythoderus*, Kl., and *Chætopisthes*, Westw., are assigned to this family.

VI. Orphnidæ. *Antennæ* 10-articulatæ. *Abdomen* segmentis ventralibus 6. *Tibiæ* posticæ spinis terminalibus binis.

Genera 1. *Hypalus*, Dej. (*Geobius*, Brullé, Laporte, and Westw. Trans. Ent. Soc. iv. 171†).

2. *Orphnus*, MacLeay, Westw. Trans. Ent. Soc. iv. 175.

3. *Triodontus*, Westw. Trans. Ent. Soc. iv. 172.

4. *Ægidium*, Dej., Westw. Trans. Ent. Soc. iv. 173; and

5. *Ochodæus*, including *Codocera*, Eschsch. (*Stomphax*, Fischer; *Psephus*, MacLeay, MS., Kirby and Spence, Intr. iii. 678).

B. Abdomen with five ventral semisegments.

"*Chætodus*? *basalis*," from a specimen in Mr. Melly's collection, of which the head was wanting. Dr. Erichson, having perfect individuals from Peru, gives the following as its generic characters:—"Dicrazodon, Er. *Mandibulæ* extus acute bidentatæ. *Tibiæ* graciles posteriores extus medio obsolete transversim carinatæ, antice extus crenulatæ, apice acute bidentatæ. *Unguiculi* simplices." Conspect. Ins. Col. Peru, Arch. f. Naturg. 13 Jahrg. 1 Bd. i. 104.

* Erichson writes this name *Hapalonychus*.

† Erichson adopts Dejean's uncharacterized name instead of *Geobius*, the latter being previously used for a genus of *Carabidæ* by Dejean.

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VII. Trogidæ. (*Metathoracis* epimera obtecta. *Antennæ* clava globulosa perfoliata. *Abdomen* segmentis ventralibus 5.) Thus divided :—

I. Die Augen ungetheilt.

A. Die Fühlerkeule einfach durchblattert.

Genera 1. *Trox*, F.
2. *Omorgus*, Er.*
3. *Cryptogenius*, Westw. Trans. Ent. Soc. iv. 169.

B. Das erste glied der fühlerkeule napfformig, die folgenden umschliessend.

Genera 1. *Anaides*, Westw., Trans. Ent. Soc. iv. 167.
2. *Chætodus*, Westw., ib. 165.†
3. *Liparochrus*, Erichson (see post).

II. Die Augen durch den einspringenden Kopfrand unvollstandig getheilt.

Genera. *Sphæromorphus*, *Synarmostes*, *Cloeotus* and *Acanthocerus*, MacLeay. See Germar's Memoir on these genera in the Zeitschrift f. d. Entomol. iv.

This separation of the *Geotrupidæ* into two families, *Geotrupidæ* and *Hybosoridæ*, and of the *Trogidæ* also into two families, *Orphnidæ* and *Trogidæ*, is an evident improvement. I cannot however but think that the variation in the number of segments in the abdomen is a character of too slight importance to be employed as the distinctive mark of the higher divisions in families.

* *Omorgus* (Er. Arch. f. Nat. 13 Jahrg. 1 Bd. p. 111) is a dismemberment from the genus *Trox*, characterized thus:—" *Ligula* prominula cornea. *Palpi* labiales articulo 1mo longiore 2do. *Maxillarum* mala interior uncis duobus corneis armata, inferiore simplici, superiore bifido. *Prothorax* haud ciliatus:" it is divided into two sections: A, with the scutellum hastate and the hind tibiæ unarmed, *Tr. squalidus*, *Ol. verrucosus*, *K. Australasiæ*, Latr., &c.; and B, with the scutellum oblong, and the hind tibiæ armed with small spines. Six South American species, one wingless, *Tr. bullatus*, Curtis, the others winged, *Tr. brevicollis*, Er. (*leprosus*, Dej.) &c.

Phoberus, MacLeay, (Horæ Ent. i. 137,) founded on *Tr. horridus*, Fab., a Cape of Good Hope species, is overlooked by Erichson in his list of genera of *Trogidæ*. It is described by MacLeay " scutello haud distincto." The scutellum is, however, distinct enough in two specimens in my Collection.

† The characters employed by Dr. Erichson to distinguish his primary divisions and families are, I think, fully proved to be unsatisfactory and unnatural, when we see *Chætodus* removed from *Silphodes*, *Apalonychus*, &c. (amongst Erichson's *Hybosoridæ*) and arranged far apart from the preceding in the family of *Trogidæ*. A comparison of the structural details of *Silphodes* and *Chætodus*, given in plate XI. of the fourth volume of our Transactions, will, I think, convince every one of the extremely intimate relation of these two genera.

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The additions which I have now to make to my former memoir belong to the last three of the subdivisional sections in the table of the genera given in p. 158 of my former memoir, which terminated with the genera *Orphnus* and *Ægidium*.

Ochodæus.

Ochodæus, Megerle, MS., Dej. Cat. 1st ed. p. 56; St. Farg. et Serv. Enc. M. x. 360; Mulsant, Lamellic. de France, p. 341; *Psephus*, MacLeay, MS., Kirby and Spence, Introd. to Ent. iii. p. 678; *Codocera*, Eschsch. Germ. Mag. iv. 397; *Stomphax*, Fischer, Entom. Imp. Russ. ii. p. 158; St. Farg. et Serv. Enc. M. x. p. 501.

The 10-jointed structure of the antennæ of this genus, mentioned in my previous paper (Trans. Ent. Soc. iv. p. 156), (contrary to the descriptions of St. Fargeau and Serville, Latreille and Mulsant), has been confirmed by Erichson (Naturg. Ins. Deutsch. p. 922). The structure also of the antennæ, labrum, mandibles and maxillæ of the type *O. chrysomelinus* having been represented in the same memoir, (pl. 12, figs. 3 *a*, *b*, *c*, *d*, *e*,) it will only be necessary in this place to notice the structure of the lower lip and its various parts, the epimera of the metathorax, the tibial ungues, and the ventral articulation of the abdomen, with the view of showing its affinity with *Orphnus* and *Ægidium*, as indicated in my tabular arrangement of the genera (Trans. Ent. Soc. iv. 158), and as given by Erichson as above mentioned in the family *Orphnidæ*.

The number of species of *Odontæus* is small, five only having yet been described. They appear however to be widely distributed, being found, according to Dr. Erichson (who mentions his knowledge of five species), in all the quarters of the globe except Australia. The following is a synopsis of all the species hitherto described, with the addition of two new ones from my own Collection:—

Sp. 1. *Ochodæus chrysomelinus*, Fabricius, &c.

Ovalis, subconvexus; fulvus, supra setulosus; clypeo ad latera bisinuato, capite et pronoto aspere granulosis, elytrisque ciliatis his striato-punctatis, interstitiis punctatis; femoribus posticis subtus dente versus apicem parvo armatis.

Long. circ. lin. 2.

Habitat in Gallia, Germania, Austria, nec non in Albania.

(Dom. S. S. Saunders.)

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Sp. 2. *Ochodæus rufus*, Guérin-Méneville, Icon. R. An. Ins. p. 83, pl. 22, fig. 6.

" Très voisine de l'*Ochodæus chrysomelinus* de Fabr.; mais elle est un peu plus grande; tout son corps est d'un roux assez vif, luisant; l'extremité des mandibules, les yeux et le bord antérieur du corselet sont bruns; la tête et le corselet sont ponctués; les elytres ont des points plus forts, avec une petite strie près de la suture, et quelques faibles traces de stries sur le reste de leur surface; les pattes sont velues et ciliées, les intermediaires et posterieures ont la jambe dilatée au bout et terminée par une couronne de l'épines assez longues."

" Habite le Senegal."

Mus. Guérin.

Sp. 3. *Ochodæus miliaris*, Klug, Col. Madagascar, p. 76.

" *O.* brunneus; capite thoraceque granulatis; elytris punctato-striatis, in interstitiis elevato-punctatis."

Long. corp. lin. 3.

Habitat Madagascar.

Mus. Reg. Berol.

Statura *O. chrysomelini*. Obscure brunneus, ferrugineo-pilosus. Caput punctis elevatis scabrum; postice obsolete punctatum, labro emarginato producto; mandibulis arcuatis, validis, intus 1-dentatis, antennis palpisque concoloribus. Thorax ubique confertim elevato-punctatus. Pectus vage impresso-punctatum. Segmenta ventralia vix punctata, testacea. Scutellum vage punctatum. Elytra punctato-striata, punctis magnis impressis, in interstitiis punctis sparsis elevatis scabra. Pedes concolores.

Sp. 4. *Ochodæus lutescens*, Westw. n. sp.

Luteus, obscurus; capite, pronoti medio postice scutelloque brunneis, supra undique granulis minutissimis obsitus, et luteo-setosissimus; mandibulis porrectis, 5-dentatis, dentibus regularibus.

Long. corp. lin. 4.

Habitat in India Orientali. D. Boys.

In Mus. Westwood.

O. chrysomelino multo major et magis depressus. Caput supra planum, margine antico paullo elevato et porrecto, carina semicirculari submarginali; tuberculisque duobus obliquis

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intus carinam. Labrum porrectum, lutescens, angulis rotundatis, in medio emarginato, longe setoso. Mandibulæ porrectæ, supra concavæ, lutescentes, singulo dentibus 5 castaneis (apicali incluso) sensim majoribus, duobus apicalibus acutis. Antennæ pallide lutescentes, articulis 6 et 7 intus angulatis setisque nonnullis instructis, clava ovali compressa. Pronotum transversum, margine postico curvato, luteum, opacum, undique granulatum et luteo longe-setosum; regione antescutellari brunnea. Scutellum elongato-triangulare, brunneum. Elytra late ovata, subdepressa, pronoto concoloria, granulata et setosa, singulo striis novem punctorum, striis 2 et 3, e scutello, magis approximatis, duabus externis fere obsoletis. Corpus infra cum pedibus lutescens.

Plate IX. fig. 1, Insectum magnitudine auctum; 1 *a*, caput supra visum; 1 *b*, labrum; 1 *c*, maxilla; 1 *d*, instrumenta labialia; 1 *e*, ungues tarsorum.

Sp. 5. *Ochodæus pictus*, Westw. n. sp. (Pl. IX. fig. 2.)

Niger, parum nitidus, pronoti angulis lateralibus anticis et posticis elytrisque fulvis, horum humeris, fascia irregulari media apiceque nigris, supra undique minutissime granulatus parum setosus, mandibulis irregulariter dentatis.

Long. corp. lin. $3\frac{1}{2}$.

Habitat in India Orientali. (D. Boys.)

In Mus. Westwood.

Caput supra fere planum, utrinque ante insertionem antennarum tuberculo elevato instructum, supra granulatum et parum setosum. Labrum nigrum, lateribus luteis. Mandibulæ nigræ, dente apicali acuto, dentibus duobus parvis mediis, supero (præsertim in mandibula sinistra) fere obsoleto, dentibusque duobus conjunctis basalibus. Antennæ piceæ, clava magna nigra, apice luteo. Pronotum nigrum granulosum, parum setosum, lateribus fulvis, colore fulvo in angulis anticis et posticis in maculas magnas dilatato. Elytra brevia, lata, subdepressa, minutissime granulata et parum setosa, fulva, singulo striis novem punctorum. Podex, corpus infra et pedes nigri, tarsis piceis.

Fig. 2, Insectum magnitudine auctum; 2 *a*, mandibula dextra; 2 *b*, mandibula sinistra; 2 *c*, maxilla; 2 *d*, instrumenta labialia; 2 *e*, antenna.

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Sp. 6. *Ochodæus bituberculatus*, Erichson, Col. Peru, p. 111.

O. testaceus, testaceo-setulosus, fronte bituberculata, femoribus muticis.

Long. prope lin. 3.

Habitat Peru.

In Mus. Reg. Berol.

Sp. 7. *Ochodæus ferrugineus*, Westw.

Lethrus ferrugineus, Eschscholtz in Mem. Acad. Sc. St. Petersb. vi. 151.

Codocera ferrugineum, Germar, Mag. d. Ent. iv. 398.

Stomphax crucirostris, Fischer, Entomog. de la Russie, ii. p. 159, tab. 32, f. 1.

Magnitudo *Aphodii fimetarii*, at latior; obscure fulvus, setosus; mandibulis elongatis, acutis, supra antice emarginatis apice cruciatis; antennarum geniculatarum articulo 1mo magno, valde hirto; oculis nigris, elytris striatis.

Long. corp. lin. 3.

Habitat Caucasus, and Teflis in Georgia.

This species was proposed as a genus to be placed among the *Lucanidæ* by Fischer von Waldheim, near the genus *Œsalus*, to which it bears a strong analogy. Dr. Erichson, however, who had doubtless an opportunity of examining the insect, refers it to the present genus, with the observation that it is "einer art welche durch längere, gerade, mehr vorgestreckte mandibeln von den übrigen, namentlich von dem allgemeiner bekannten *O. chrysomelinus* abweicht und deshalb für einen *Lucaninen* angesprochen wurde. Irrthumlich ist von Fischer die fühlerkeule als 4-gliedrig beschrieben, und abgebildet, sie ist ebenso als beim *O. chrysomelinus* gebildet von dem die obige art, ausser in der form der mandibeln, keine erheblichere abweichung zeigt, als eine der vier anderen mir bekannten arten."

The three following additional new species are unique in the Collection of M. Reiche, to whom I am indebted for an opportunity of describing them, and by whom the specific names adopted below have been proposed.

Sp. 8. *Ochodæus Americanus*, n. sp.

Piceo-castaneus, nitidus, punctatus, luteo-setosus; mandibula-

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rum margine interno 3-dentato, vertice carina transversa media; antennarum clava lutea.

Long. corp. lin. $3\frac{1}{2}$.

Habitat in America Boreali.

In Mus. Reiche.

Individuis majoribus *O. chrysomelini* magnitudine æqualis at magis elongatus, coloreque obscuriori. Caput punctatissimum, margine antico clypei magis elevato nitido et bi-angulato. Mandibulæ supra concavæ, apice subacutæ, margine interno tridentato, sinistra inter apicem et dentem primum paullo producta; vertex carina tenui lævi polita transversa abbreviata notatus. Antennæ lutescentes. Prothorax punctatus, valde setosus. Elytra punctato-striata, spatiis inter strias punctis minutis setigeris obsitis, punctis fere in lineas tres longitudinales inter paria striarum dispositis. Pedes picei, femoribus magis rufescentibus, tibiarum anticarum dentibus duobus apicalibus magnis, 3tio basali minuto.

Plate IX. fig. 3, mandibulæ cum clypeo.

Sp. 9. *Ochodæus luridus*, n. sp.

Oblongo-ovalis, punctatissimus, luteo-testaceus, capite castaneo, vertice tuberculis duobus inter oculos transverse positis, mandibula dextra dente 1, sinistra 2-dentata.

Long. corp. fere lin. 4.

Habitat in Mexico.

In Mus. Reiche. (An *O. bituberculatus*, Erich.?)

Præcedenti paullo major, et magis ovalis. Caput punctis parvis obsitum. Clypeus sub-concavus, medio marginis antici recto. Mandibula dextera apice acuto, denteque acuto in medio marginis interni armata; sinistra dente acuto sub apicem, cum incisione profunda ovali dente minori infero instructa; vertex carina transversa recta in medio interrupta, inter oculos. Antennæ lutescentes. Pronotum scabrum, punctis numerossimis. Elytra striato-punctata, interstitiis inter strias punctis minutis setigeris triplici serie fere regulariter ordinatis. Pedes lutescentes, tibiis anticis ut in specie præcedenti formatis.

Plate IX. fig. 4, mandibulæ cum clypeo.

Sp. 10. *Ochodæus rugatus*, n. sp. (Plate IX. fig. 5.)

Piceo-castaneus, elytris magis piceis, punctatus; capitis vertice haud carinato, elytris profundius striatis, punctisque majoribus insculptis; tibiis anticis 3-dentatis.

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Long. corp. lin. $3\frac{3}{4}$.
Habitat in Nova Granada.
In Mus. Reiche.
Præcedenti magnitudine æqualis, at magis depressus et subinde latior; rugositate elytrorum, tibiarumque anticarum structura primo intuitu e cæteris distinctissima. Caput supra fere planum, profundius punctatum, haud carinatum; clypei margine antico haud angulato, subrotundato. Antennæ piceæ, articulo basali castaneo (clava deterita). Mandibula dextera apice acuto, dente parvo acuto in medio marginis interni; sinistra dente majori interno, incisione profunda media, margine infero incisionis haud in dentem producto. Pronotum convexum, punctis majoribus et magis distantibus insculptum. Elytra profundius striata punctisque profundis in striis dispositis, interstitiis inter strias rugosis, punctis paucioribus setosis. Pedes piceo-castanei, tibiis anticis dentibus duobus æqualibus apicalibus, denteque 3tio minori obtuso fere medio armatis.

Plate IX. fig. 5, Insectum magnitudine auctum; fig. 5*a*, caput supra visum cum labro; fig. 5*b*, mandibulæ; fig. 5*c*, maxillæ; fig. 5*d*, labium.

Obs. *Ochodæus chrysomelinus* habitat in Albania (Dom. S. S. Saunders), nec non in India Orientali (Dom. Hearsey). Individuum Indicum in Mus. Reichei vidi cum nomine *Ochodæus Indianus* inscriptum, ex Europæis haud differre videtur. Alterum amico Hearseio transmissum majus, dentibus mandibularum distinctioribus, elytrisque magis setosis, setis in seriebus quatuor fere regularibus inter strias dispositis; vix tamen species distincta.

Liparochrus, Erichson. (*Ranidia*, Westw. MS. olim.)

This genus has been merely indicated by Dr. Erichson in his distributions of the *Trogidæ* (above detailed) with the following short note: "Eine neue-hollandische gattung welche in der körperform an *Acanthocerus* erinnert, aber nicht kugeln kann; die hinteren schienen sind auch nicht schildförmig erweitert sondern dick und mit borsten reihen besetzt: das erste glied der fühler ist ebenfalls nicht erweitert und die augen sind nicht durchsetzt." (Naturg. Ins. Deutschl. p. 925.)

The following are the characters of this curious genus:—

Corpus breve, ovale, gibbosum, glabrum, nitidum; capite parvo inermi; prothorace elytrorum fere latitudine, lateribus reflexis. *Caput* subquadratum, angulis anticis lateralibus rotundatis, margine antico parum reflexo. *Labrum* breve, trans-

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versum, integrum. *Mandibulæ* porrectæ breves, basi lato, interne in laminam tenuem productæ, apice subfalcatæ supra versus apicem subemarginatæ. *Maxillæ* lobis duobus coriaceis, setosis, inermibus. *Palpi* maxillares satis breves, articulo 2do et 4to longioribus. *Mentum* subquadratum, valde setosum. *Labium* breve, transversum, in medio emarginatum. *Palpi* labiales brevissimi, 3-articulati, in scapos duos latiores insidentes. *Antennæ* breves, 10-articulatæ, articulo basali crasso setoso, tribus ultimis clavam subsemiglobularem formantibus, articulo 1mo clavæ majori reliquis duobus recipienti. *Prothorax* transversus, convexus, angulis anticis porrectis, marginibus lateralibus parum reflexis. *Scutellum* parvum, triangulare. *Elytra* gibbosa, tuberculo humerali prominenti. *Pedes* breves. *Tibiæ* anticæ 3-dentatæ basique externe denticulatæ et calcari unico longo terminali instructæ. *Tibiæ* 4-posticæ extus sensim crassiores, subtriquetræ, angulis serratis et setosis, calcaribus duobus longis instructæ. *Tarsi* cum unguiculis simplices.

The general appearance of the species of this genus is very similar to that of some of the more oval formed *Acanthocerides*, but the eyes are not divided by a canthus at the sides of the head, nor are the four hind tibiæ dilated; the clypeus is also much more quadrate, and the first joint of the club of the antennæ is cup-shaped, receiving the second and third joints, which, especially the last, is very much smaller than the first joint of the club. In its structural details it approaches very closely to *Anaides*, Westw. Trans. Ent. Soc. IV. Pl. XI. fig. 6, and details, and *Hybosorus*, ditto, Pl. XI. fig. 1.

Sp. 1. *Liparochrus geminatus*, Westw. (Plate IX. fig. 6.)

Piceo-niger, nitidus; capite transversim rugoso, pronoto et elytris vage punctatis; his striis gracillimis per paria dispositis impressis.

Long. corp. lin. 4.

Habitat in Nova Hollandia, prope Adelaidam.

In Mus. Westwood.

Caput subquadratum, angulis anticis lateralibus rotundatis, supra subconvexum; margine antico parum reflexo, supra transversim punctatum. Antennæ et mandibulæ castaneo-piceæ. Pronotum nigrum, nitidissimum, convexum, punctis parvis vage impressum, lateribus parum reflexis, subcastaneis et magis rugosis. Elytra convexa, nitida, sutura subcastanea,

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parcius punctata, singulo striis 9 gracillimis, suturali impari, reliquis per paria dispositis. Pedes nigri.

Fig. 6, Insectum magnitudine auctum; 6 *a*, caput a latere visum; 6 *b*, clypeus, mandibula, labrum et antenna; 6 *c*, antenna; 6 *d*, apex clavæ antennarum; 6 *e*, mandibula; 6 *f*, maxilla; 6 *g*, instrumenta labialia; 6 *h*, tibia et tarsus anticus; 6 *i*, tibia et tarsus posticus.

Sp. 2. *Liparochrus fossulatus*, Westw.

Niger, capite punctatissimo obscuro, pronoto æneo-nitido, punctis minimis vage impresso, lateribus castaneis; elytris nigris, nitidis, callositate humerali castaneo, striatis, striis dorsalibus punctis magnis notatis.

Long. corp. lin. 4.

Habitat in Nova Hollandia, prope Adelaidam.

In Mus. Westwood.

Caput subquadratum, angulis anticis rotundatis, disco punctatissimo. Mandibulæ et antennæ piceæ. Pronotum glaberrimum, punctis minimis vage impressum æneum, lateribus reflexis castaneis. Elytra nigra, nitidissima, singulo striis novem, dorsalibus per paria dispositis, punctis magnis ovalibus parum profundis impressa. Pedes nigri.

Sp. 3. *Liparochrus sculptilis*, Westw. (Pl. IX. fig. 7.)

Piceo-niger, subnitidus, marginibus pronoti castaneis, undique punctatissimus, punctis pronoti et elytrorum transversim plus minusve confluentibus; elytris striatis, striis per paria dispositis, tibiis anticis 2-dentatis.

Long. corp. lin. 5.

Habitat in Novæ Hollandiæ partibus orientalibus, prope fluvium Mundarra dictum.

In Mus. D. Bond.

Præcedentibus duobus fere duplo major, minus convexus, subnitidus, punctatissimus. Caput parvum, subquadratum, angulis anticis rotundatis, punctis numerosis, distinctis et profundis impressum; vertice postice transversim elevato nitido, vix tamen carinato. Maxillæ lobi interni apice in dentem obtusum brevem producto. Pronotum punctis minutis oblongis transversis numerosissimis undique insculptum. Elytra rotundata, dorso parum depressa, undique punctis minutis curvatis plus minusve confluentibus, striisque novem simplicibus longitudinalibus in singulo ornatis, per paria dispositis; suturali sola impari. Pedes picei, tibiæ anticæ ante medium

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parum dilatata, extus serrata, dentibus duobus apicalibus tantum armatis.

Plate IX. fig. 7, Insectum magnitudine auctum; fig. 7*a*, maxillarum lobi apicales; fig. 7*b*, tibia antica.

GLARESIS, Frivaldszky, MS.

This is another remarkable genus, merely indicated by Dr. Erichson, at the end of the Lamellicorn beetles, in the following note: "Der noch unbeschriebene gattung *Glaresis*, Friv., gehort auch vermuthlich zu den *Trogiden*, ich habe zu indess noch nicht naher untersucht. Ein merkwürdiger kafer (*Gl. rufa*, Friv., aus Ungarn), welcher in seinen Aeussern auch an *Psammodius* erinnert. Die fühlerkeule ist sehr gross. Die mandibeln sind an der wurzel breit, die spitze ist schmal und scharf. Die augen sind vom erweiterten kopfrande halb durchsetzt. Der hinterleib ist ganz häutig, von unten durch die verdickten hinterbeine gedeckt. Die hinterschienen sind an der spitze hackenformig velangert; die hinterfusse sehr kurz. Von den übrigen *Trogiden* weicht diese gattung auch dadurch merklich ab, dass die beine keine scharr,—sondern wirkliche Grabbeine sind."—*Naturg. Ins. Deutschl. Col.* p. 925, note.

The following are the detailed characters of this little genus, which, in the structure of the mouth, appears to me to approach much nearer *Orphnus* and *Ægidium* than to *Trogidæ*. The structure of the antennæ, mandibles and maxillæ clearly proves that there is no real relation between this genus and *Psammodius*.

Corpus obovatum, antice angustius, convexum, setulosum. *Caput* (fig. 8*a*), breve, latum, inerme, utrinque ante lobum oculos secantem incisum, oculi septo semidivisi (fig. 8*b*). *Clypeus* brevissimus. *Labrum* breve, transversum, vix emarginatum, angulis lateralibus rotundatis, ciliatum. *Mandibulæ* porrectæ, corneæ, extus rotundatæ hirsutæ, basi latiores, dente acuto curvato terminatæ, intus ante apicem lobo lato truncato, et incisione prope basin, membrana obsita, instructæ (fig. 8*c*). *Maxillæ* elongatæ bilobatæ, lobis spinulis seu ciliis robustis curvatis armatis, extus setis longis instructæ. *Palpi* maxillares breves, articulo basali brevissimo; ultimo crassiori elongato-ovale (fig. 8*d*). *Mentum* subquadratum, antice paullo latius, valde setosum. *Labium* vix productum, setis obtectum. *Palpi* labiales, breves, clavati, articulo basali brevissimo, tertio magno subtruncato (fig. 8*e*).

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Antennæ breves, 10-articulatæ, articulo 1mo apice clavato, 2ndo robusto, 3—7 brevissimis oblique transversis, 8vo maximo reliquis duobus subincludenti (fig. 8*f*). *Prothorax* transversus, capite latior, antice paullo angustior, lateribus subrotundatis, angulis posticis acutis. *Elytra* magna, convexa, podicem tegentia, profunde sulcata, spatio angusto inter sulcos elevato setoso. *Pedes* antici breves. *Femora* crassa, tibiæ extus tridentatæ (fig. 8*g*). *Pedes* intermedii graciles, tibiæ prope medium spinula parva armatæ (fig. 8*h*). *Pedes* postici breves, femoribus valde incrassatis, tibiis brevibus latis pone medium extus emarginatis, apice in lobum crassum oblique truncatum producto (fig. 8*i*).

Species unica. *Glaresis Frivaldszkyi*, Westw.
(Pl. IX. fig. 8.)

Glaresis rufa, Frivaldszky, MS.

Totus luteo-rufescens, opacus, pronoto subnitido, capite tenuissime punctato, pronoto punctato, sulco medio impresso, elytrorum singulo 9-sulcato, spatio angusto inter sulcos granulato et setoso.

Long corp. lin. 2.

Habitat in Hungaria.

Mus. Hope, nostr. &c.

Fig. 8, Insectum magnitudine auctum; 8*a*, caput cum mandibula dextra; 8*b*, oculus septo semidivisus; 8*c*, mandibula; 8*d*, maxilla; 8*e*, mentum cum palpis lateralibus; 8*f*, antenna; 8*g*, pes anticus; 8*h*, pes intermedius; 8*i*, pes posticus.

The family *Trogidæ* has been further enriched with a new genus by M. Mulsant, the distinguished Entomologist of Lyons, under the name and character of

Eremazus.

" Pieds intermédiaires aussi rapprochés que les autres à leur naissance. Ecusson visible. Elytres embrassant l'abdomen dans son pourtour, et cachant le pygidium. Epistome tronqué en devant. Labre transverse; débordant faiblement l'epistome, et laissant à découvert la majeure partie des mandibules, qui sont cornées. Antennes insérées au devant des yeux, sous un faible rebord de la tête : à premier article hérissé de cils. Yeux très-rétrécis en dessus par les joues et par le front, faiblement visibles près des angles de devant du prothorax; celui-ci non sillonné.

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Palpes maxillaires à dernier article plus long de tous, rétréci de la base à l'extremité. Ventre moins long que les deux derniers segments pectoraux. Cuisses renflées. Jambes de devant fortement tridentées au côté externe. Tarses rétrécis à partir de l'extremité du premier article; celui-ci en triangle allongé. Ongle unique. Corps suballongé.

" Les insectes de cette coupe, par la forme de leurs corps, se rapprochent des premiers *Pleurophorates*, dont ils s'éloignent par la grosseur de leurs cuisses. Ils ont plus d'analogie avec les *Psammodiaires*, et semblent servir à unir ceux-ci aux *Trogidiens*."

It is to be regretted that M. Mulsant has omitted to describe the form of the scutellum, and to state whether the elytra are soldered together, or whether the insect is winged, as well as to describe the structure of the mandibles, maxillæ, mentum, and labium; so that, in the absence of these particulars, we are quite unable to determine the precise affinities of the genus.

The genus consists of a single species.

Eremazus unistriatus, Mulsant, Proceed. Acad. des Scienc. Lyon, 13 February, 1851.

" Suballongé et subparallele; d'un fauve obscur sur la tête et sur le prothorax, plus pâle et plus roussâtre sur les elytres: celles-ci rayées d'une strie naissant du calus, et offrant postérieurement les traces de deux autres stries."

Long. corp. 1⅓ lin.; lat. ⅓ lin.

Habitat Algeria.

I take the opportunity of adding two further communications having reference to the previously-published Memoir upon these Lamellicorn insects, with which I have been also favoured by M. Reiche, of Paris.

Orphnus Verreauxii, Reiche. (Westw. in Trans. Ent. Soc. IV. p. 179.)

M. Reiche informs me that this insect is the true *Scarabæus Corydon*, Olivier, Ent. n. 227, t. 28, f. 245; Oliv. Abb. Sturm. i. p. 113, n. 227, t. 52, f. 4; Schonherr, Syn. Ins. i. p. 15.

Scarabæus Silenus, Jablonsky, Nat. S. ii. p. 87, n. 70, t. 10, f. 2.

Scarabæus Rhinoceros minor, Voet, Col. t. 18, f. 119, ed. Panz. i. p. 79, n. 119.

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Triodontus Owas, Reiche, MS. (Pl. IX. fig. 9.)

Castaneo-piceus, nitidissimus lævis, capite cornu erecto armato, pronoto antice retuso, 6-dentato, elytris striisque longitudinalibus gracillimis vix punctatis.

Long. corp. lin. 7.

Habitat in Madagascar.

In Mus. Reiche, Parisiis.

Tr. nitidulo (Westw. Tr. Ent. Soc. IV. 173) triplo major, pronotoque magis armato. Caput semicirculare, nitidum, læve, margine antico parum elevato; vertice cornu valido erecto armatum. Mandibulæ acutissimæ, singula dentibus duobus marginis interni acutis (in dextera magis approximatis.) Maxillæ lobo supero dentibus duobus validis curvatis acutis armato; lobo infero etiam bidentato. Pronotum læve, nitidum, antice valde retusum, in medio dentibus duobus contiguis alterisque duobus in utroque latere, margine postico nec non basi elytrorum serie transversa impressionum profundarum. Elytra lævissima, nitida, singulo striis 9 gracillimis vix punctatis notata. Pedes castanei.

Plate IX. fig. 9, Insectum magnitudine auctum; fig. 9 *a*, mandibulæ; fig. 9 *b*, maxillarum lobi apicales; fig. 9 *c*, antennæ.

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XII. *Contributions towards the Natural History of British* Microlepidoptera. *By* J. W. Douglas, Esq.

[Read 5th July, 1852.]

Under this title I propose to give a descriptive account of the early state of our native *Tineidæ* as the particulars may from time to time be discovered, accompanied by illustrative figures from the pencil of Mr. William Wing.

When the importance of such a labour is considered, with respect to the natural history and determination of species, the facility of acquiring rare species by a knowledge of their habits and food as larvæ, and also with reference to the wide field there is for research, I trust I may be pardoned for entering on such an extensive arena, and for requesting, as I now do, to be furnished with examples of such larvæ as may occur to collectors. I am also not without hope, that seeing how much light is thrown upon the species of our smaller moths by such investigations as these, our collectors will direct more attention to larvæ than they have hitherto done, and rival our brethren of France and Germany.

While it will thus be seen that the elucidation of the natural history of species is the intention of these memoirs, it may also probably happen, although I see no reason to give the first place to characters derived from larvæ, that some assistance may be derived therefrom towards deciding difficult points in the generic association of species.

Genus Gelechia, Zeller.

At a cursory glance the three species, *Gelechia contigua*, *blandella*, and *fraternella*, might easily be taken for varieties of one: the difference between *contigua* and *blandella* appears to be more one of colour than of marking, and *fraternella* comes so near to *contigua* that at first it was placed as a variety of it. That these are three good and distinct species will now be satisfactorily shown, and it is hoped that no long period may elapse before the distinctness of *G. marmorea*, *junctella*, *maculiferella*, and *Hübneri*, species also very similar to each other, may be as decidedly made out by the discovery of the earlier states of each.

If in the month of March we walk by the side of a hedge where *Stellaria holostea* grows, we may observe that many of the terminal shoots of the plant are drawn up and frequently discoloured; if we investigate more closely the cause of these appearances, we shall find that the leaves are drawn together by a small whitish-

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yellow larva with pink stripes, which devours them from within: later in the season, towards the middle of April, we may notice the flower shoots drawn together in the same way, and on opening them we generally find that the young buds have all been devoured, and the excrements of the voracious larva left in their place. All this is by *G. contigua*.

If we examine the same plant early in May we shall again find the young shoots drawn together, but no longer by the same larva. We now meet with a pale greenish-yellow larva, without any pink stripes: and later, when the seeds are nearly ripe, we find, on opening the capsules, that many of them contain the same greenish-yellow larva, nearly full fed. This is *G. blandella*. The *S. holostea* has thus its young shoots devoured by two enemies, one of which afterwards leaves them for the flower buds, while the other takes to the seeds.

At the beginning of April, if we bring our eyes near the ground in places where *Stellaria uliginosa* grows, and push aside the grass or withered leaves that may cover it, we shall find the young shoots, many of them hardly an inch above the ground, but instead of being of a regular form as healthy shoots should be, they are knobbed and twisted in a very singular way: each of them contains a dirty brown Lepidopterous larva. It may seem incredible that this should be the larva of so scarce a species as *G. fraternella*, for a glance around will show us it is evidently no rarity, but it is the habit of the perfect insect to keep very quiet, and hence it is rarely seen; whereas, judging from the abundance of contorted shoots of the *S. uliginosa*, there are few insects more plentiful.

Gelechia contigua, Haworth, Douglas. (Trans. Ent. Soc. Vol. V. p. 196.)

Larva (Pl. X. fig. 1).—Length 4 lines.—Robust; pale dull whitish, with a greenish-yellow tinge, and with many short hairs placed in rows. Head black, second segment black above, with a slight pinky line in the centre; a pink stripe down the centre of the back, on each side of which are two other stripes of the same colour, that nearest the centre being broader than the other and wavy; a still slenderer line of the same colour just above the legs. On the top of each segment after the second are four small black dots, the two anterior ones, on the central segments, being nearer to the dorsal stripe than the two posterior; a row of black dots on the side between the second and third pink stripes, and another row above the legs, one dot being on each segment: on the third,

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fourth, and last segments these dots are placed nearly in a transverse line. Six pectoral legs black, eight ventral and two anal legs the colour of the body.

This larva, the discovery of which is due to Mr. Stainton, is found, generally full grown by the middle of April, in the young terminal shoots of *Stellaria holostea* (fig. 1 *a*), the leaves of which it agglutinates and twists into a habitation, in and on which it feeds, removing therefrom and forming other similar dwellings as occasion requires.

Pupa (fig. 1 *b*).—Brown, with a short anal spine; formed on the ground within a cocoon spun by the larva, to which small particles of earth, &c. adhere.

Imago (fig. 1 *c*).—Appears in June and July.

Gelechia blandella (Fischer v. R.), Zeller, Douglas. (Trans. Ent. Soc. Vol. I. (N. S.) p. 246.)

Larva (Pl. X. fig. 2).—Length 4 lines.—Light greenish-yellow. Head black, second segment black above, with a fine white central line, and a small black dot on the side. Each of the other segments bears six very small black dots, whereof four are on the back, placed as in *G. contigua*, and one on each side, from each of them proceeds a short hair: there are also some minor dots, one or two on each segment lower down on the side forming a row: more or less visible according to the age of the larva. Six pectoral legs brownish, the first pair are darker than the other two pairs, the eight ventral and two anal legs are of the colour of the body.

Feeds at first on the young shoots of *Stellaria holostea*, the leaves of which it draws together just like *G. contigua*. It afterwards feeds upon the seeds of the same plant (fig. 2 *a*) within the capsules, and is full grown about the middle of June. These particulars were discovered by Mr. Stainton.

Pupa.—Like *G. contigua* and *fraternella*, and formed in a cocoon.

Imago (fig. 2 *c*).—Appears in July.

Gelechia fraternella, Douglas. (Trans. Ent. Soc. Vol. I. (N. S.) p. 101.)

Larva (Pl. X. fig. 3).—Length 4 lines.—Robust, light dirty brown, with many short dark hairs, placed in rows. Head small, black; second segment black above, with a fine central white line; four black dots with a white pupil, on the back of each of the other segments, the posterior two being further from the centre than the anterior two, especially on the middle segments, being on

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the third, fourth and last disposed more in a transverse line; on the side is a row of black dots, one on each segment, and another similar row lower down above the legs. Six pectoral legs black, eight ventral and two anal legs the colour of the body.

Found from the beginning of April to the middle of May on the young shoots of *Stellaria uliginosa* (fig. 3 *a*), the leaves of which it fastens together, making a habitation in which it lives and eats, and from which it removes and forms another as often as the supply of food becomes exhausted. Unlike its congeners, it is very dull and inactive in its movements.

Pupa (fig. 3 *b*).—Brown, with a short anal spine; changes from the larva on the surface of the ground, within a cocoon of earth and small fragments of vegetable matter.

Imago (fig. 3 *c*).—Appears in July. I described this species in the Transactions of this Society (Vol. I. (N.S.) p. 101) from a specimen taken in Mr. Stainton's hedges, but now, compared with a bred specimen, the colours are dull and faded.

First the perfect insect and then the larva were discovered by Mr. Stainton at Lewisham, and I found the latter at Penge and West Wickham.

Genus Coleophora, Zeller.

The larvæ of this genus are singularly interesting. They make cases, which in the several species differ greatly in form and colour; in these they live and literally move, for they carry them about throughout the whole period of their existence. They feed on the leaves of plants, subsisting on the parenchyma, to obtain which they partially emerge from their cases, and thrust their bodies into leaves between the cuticles, often so far that but a small portion remains in the case, but they appear to have no difficulty in returning. As they grow they enlarge their cases by adding portions of the leaves of the plant upon which they feed, the sutures of the pieces joined on usually remaining visible; they also have the power of forming entirely new cases. As might be expected from these larvæ having to carry such cumbersome cases, their movements are not very active, and in some instances are very grotesque. When full-fed they turn round in their cases, after having made the mouth-end fast, and then become pupæ; and when they assume the perfect state, the pupa skin does not project from the case, but remains within, so that it frequently happens to the collector that he takes cases fastened up, but from which the tenant has escaped.

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The habits of the perfect insects are very retired, and it is quite possible for a species to be in abundance in a locality, and yet never be seen; the larvæ, however, cannot so easily escape observation, for from their mode of feeding, ingenious though it seems, and apparently likely to retard their discovery, they are in fact readily detected. The larva attaches its case to the underside of a leaf, and penetrating the lower epidermis, feeds on the parenchyma. The case is out of sight, under the leaf, the larva is partly in the case, partly in the leaf, thus also out of sight; but by eating the parenchyma, it discolours the upper surface, which at that spot appears white, yellow or brown, or at any rate of a different colour from the rest; so soon therefore as we observe this discoloration of the leaf, we turn it over, and there, fast to the underside, find the case of the larva.

The three species of *Coleophora* here mentioned have been discovered within the last few years.

If in February or March we look in a hedge-bottom where *Glechoma hederacea* grows, we shall frequently find white blotches on the leaves, and under these leaves the long brown cases of *albitarsella*.

If early in May we search the *Centaurea nigra*, we may perchance find some transparent pale brown blotches, caused by the larvæ of *Alcyonipennella*; it does not appear nearly so generally distributed as *albitarsella*.

If in April we examine the *Stellaria holostea*, we may observe many plants in which half the leaves have become white; this is the work of *solitariella*, the cases of which will be found attached to the undersides of the leaves.

Coleophora albitarsella, Zeller. (Linn. Ent. IV. p. 378.)

Larva case (Pl. XI. fig. 1).—Length 5 lines.—Black, cylindrical, slightly curved, brownish and flattened at the apex, and there produced on one side into a thin projecting structure like a keel or the blade of an oar; a slightly raised suture also extends along the same side the whole of the remaining length of the case. The margin of the mouth is slightly expanded.

Larva (fig. 1 *a*).—Length 3½ lines.—Dull, greenish white, a few fine hairs at each extremity; head pale brown; second segment pale brown above, the anterior margin still paler, a faint light line down the centre; third segment with two large black spots, divided by a pale line; fourth segment with two oval black spots; there is also a black dot at the side of the second, third and fourth seg-

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ments, and a quadrate black patch on the anal segment. Six pectoral legs slightly brownish, eight ventral and two anal legs concolorous with the body.

The larvæ feed on *Glechoma hederacea* growing in hedges and shady places, adhering to the underside of the leaves, and betraying their presence by the white spots made by the extraction of the parenchyma (fig. 1 *b*). They are hatched in summer, and feed till quite late in the autumn, and are again found active in March, which is the best time to take them, for although they feed till May, they are not easily seen when the plant has grown up.

Imago (fig. 1 *c*).—Appears in June and July.

This species was exceedingly rare in England until Mr. Stainton found the larvæ.

Coleophora Alcyonipennella, Kollar, Zeller. (Lin. Ent. IV. p. 208.)

Larva case (Pl. XI. fig. 2).—Length 4 lines.—Black, with a whitish line along the side, cylindrical, straight, behind the mouth abruptly and shortly curved, the apex triangular.

Larva (fig. 2 *a*).—Length 3 lines.—Dull whitish-yellow, a few fine hairs at each extremity. Head black or black-brown; second segment black above, with a fine white line in the centre, and a black spot on each side; third segment with a long, black, transverse, posterior spot, at each end of which, but anterior, is a somewhat oval black spot, and a small dot below; fourth segment with two black spots on each side; anal segment with a black patch. Six pectoral legs whitish, annulated with brown; eight ventral and two anal legs the colour of the body, the latter pair with a slight spot of black.

This larva feeds on the leaves of *Centaurea nigra* in April and the beginning of May, causing the appearance of white spots (fig. 2 *b*). It was discovered last year at Birkenhead by Mr. C. S. Gregson, and this year I took it at Sanderstead and Lee.

Imago (fig. 2 *c*) appears in June.

Coleophora solitariella, Zeller. (Lin. Ent. IV. p. 397.)

Larva case (Pl. XI. fig. 3).—Length 4 lines.—Straight, slender, three-fourths of the circumference dull brownish-grey; the other fourth whitish, with a very fine raised suture on each portion; apex whitish, triangular; mouth widened, and just behind it the case is curved obliquely.

Larva (fig. 3 *a*).—Length 3½ lines.—Pale dull ochreous. Head light brown; second segment dark brown above, with a fine

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white line down the centre, anterior margin pale, at the side a black dot; third segment with two posterior, triangular, brown spots divided by a fine white interval; anteriorly and towards each side is a pointed black dot, and a black dot on each side; fourth segment with two black dots somewhat removed from the centre, and on the side one similar black dot; the anal segment with a nearly quadrate black patch, and a small black dot at the base of the short anal legs. Six pectoral legs pale brownish, eight ventral and two anal legs the colour of the body. Feeds on the leaves of *Stellaria holostea* (fig. 3 *b*), which thereby become discoloured.

Last autumn Messrs. Grant and Dunning found several of the cases at Putney on *Stellaria holostea*, and the larva lived through the winter. In April this year, Mr. Stainton discovered the larvæ on the same plant growing in hedges at Lewisham. The specific name has proved to be singularly inappropriate, for the larvæ are quite gregarious, five or six being commonly seen on a shoot of the plant *Stellaria:* but they are difficult to rear.

Imago (fig. 3 *c*) appears in July. Zeller described this species from a single specimen bred from a case found by him attached to grass; it is very rare in collections in this country.

XIII. *Notes on the Development of* Osmia parietina, *and other British Insects. By* F. Smith, Esq.

[Read August 2nd, 1852.]

In the ninth volume of the "Zoologist" I published some account of the habits of *Osmia parietina*, a little bee which had selected the under side of a stone on which to affix the balls of pollen on which to deposit its eggs. This stone was discovered in early spring on the Grampian Hills, near Perth, too early in the season for any of the brood to have issued from the cocoons. At the time of its discovery about one-third of the cocoons were empty, showing that at least that portion of the mass had been developed during the previous season. The only difficulty was this—had the parent bee or bees deposited on the same stone two successive seasons? The stone came into my possession in the autumn of 1851; and in the month of November, finding that a number of the cocoons were still unopened, I cut one or two in such a manner that I could raise as it were a trap-door and watch the progress of the bees. All that I opened contained larvæ. After closing them, and carefully preventing the admission of air,

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I left them undisturbed until the month of April of the present year. I found them at that time still in the larva state, in which they remained until the beginning of June, when they changed to pupæ. On the fourth of July a male came forth, and subsequently a female. The rest perished in the cocoons during my absence in the country, having been exposed to the intense heat of the sun. This was a matter of little consequence; an important discovery had been made. A portion of the deposit of eggs made in 1849 had been three years in arriving at their perfect development. It were vain, in my opinion, to attempt to account for the circumstance. In the first instance, the whole mass of eggs had been subject to the same influences, and had produced larvæ, some of which had become perfect bees in 1850—others in 1851,—leaving about twenty-five out of 230, about the original number, to be developed in 1852. This, I believe, is the first instance on record of such a circumstance occurring in the aculeate *Hymenoptera*, although numerous instances have, I believe, been observed in other orders. I have before noticed the non-development of numerous individuals out of a quantity of the larvæ of *Anthophora retusa* during the first season; and any one who will examine a colony of *Anthophora* in the month of November will find both larvæ and perfect insects. Circumstances such as I have recorded may serve in some measure to account for the abundance or scarcity of certain species during different seasons; but I must confess myself quite unable to advance any opinion as to the cause of this arrest of development.

I feel that I am justified in stating 1849 as the time when the deposit of eggs took place, and I believe it to have been made by several bees using the same spot for that purpose. It is clear that in 1850 about one-third were developed, and a portion having been retarded until 1852, I think it a fair presumption that the whole deposit was made in the same and not in successive seasons.

In the month of March last I observed that many young shoots of the aspen, in Turner's Wood, Hampstead, were much swollen, at distances varying from four to six or eight inches apart,—on splitting them, I found a channel, varying from three to four inches in length, up the middle of the stick; at the extremity of which was either the larva of a longicorn beetle, or that of some dipterous insect; in one or two instances I found the dipterous larva within the dried skin of that of the longicorn; the dipterous larvæ were as ten to one of that of the longicorn. From these shoots, which I kept exposed to all the vicissitudes of the weather, during the first week in May the flies began to appear, and proved to be *Tachina*

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nitidula. The longicorn *Saperda populnea* did not appear until the second week in June.

Many Entomologists, like myself, must have observed towards the end of summer those little cartridge-like rolls on the leaves of young oaks in woods, &c. and have understood them to be the production of *Attelabus curculionoides;* my impression was, that if so, they were formed by the larvæ of that insect as a nidus, in which to undergo their transformations. I have now succeeded in satisfying myself that I was mistaken in this particular,—they are formed by the perfect insect. I found these leaf-rolls in great numbers in Yorkshire, in July, also the perfect insect; and, although I did not observe them in the act of rolling them, still, on unrolling many recently formed, I found an egg of a yellow colour.

Last year, in the month of September, I found the leaf-rolls very abundant in a wood near Hampstead, and collected as many as would fill a half pint measure; after opening about twenty, all of which were empty, I found one containing a full-grown larva. I placed the rest in a flowerpot, on mould, leaving them exposed to the weather until the month of April, when I covered the pot with fine net, and about the middle of the month of May, I had several specimens of *Attelabus* developed, but a much larger number of a species of Chalcididous insect, which will probably in some measure account for the small number of *Attelabus* developed, as compared with the number of cases collected. I found on digging into the mould that the larva had buried itself to undergo its transformations.

Last year, 1851, in the month of May, I observed numbers of a little wood-boring beetle, *Scolytus destructor,* busily engaged in burrowing in the bark of an elm branch. In autumn I cut off a portion, in order that I might observe their transformations; on examining the progress of the insect in April following, I found the beetle still in the larva state. At the extremity of every sixth or eighth gallery formed by the *Scolytus,* I observed a small Hymenopterous larva. About the end of May the beetles began to appear, and also a number of a small Chalcididous insect,—*Cheiropachus quadrum.*

From another piece of wood, containing the larvæ of *Ptilinus pectinicornis,* I bred numbers of another parasite, also belonging to the *Chalcididæ,—Caloseter vernalis.*

I have also, again, bred specimens of a species of *Hylæus* from

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a bramble stick; the larvæ were five in number, placed at about half a line apart, without any separation constructed between them, in fact exactly agreeing with the description which I published of *Hylæus signatus* five years ago; but, as far as I know, it was Mr. Thwaites who first proved the *Hylæi* to be working bees, and the subsequent observations of myself, and also of Mr. S. Saunders, have confirmed his observations, made in 1841. The species which I have bred this year is my own, *Hylæus hyalinatus.*

XIV. *Descriptions of some new Species of the Coleopterous Family* Paussidæ, *with a Synopsis of the Family. By* J. O. Westwood, Esq., F.L.S.

[Read 2nd August, 1852.]

Having already on several occasions brought under the notice of the Entomological Society the very remarkable insects composing the family *Paussidæ*, I should have hesitated in again doing so were not the additions which I purpose describing in the present paper of considerable importance. The description of a single species, and that not even a novelty in science, may, it is true, be rendered most worthy of attention when treated by a Reaumur, a Lyonnet or an Audouin, but the zoological, technical descriptions of a few isolated species can scarcely expect to obtain notice. In the present instance, however, although so short a time has elapsed since I published a revised and extensively-illustrated Monograph of the *Paussidæ* in the second volume of my "Arcana Entomologica" (1845, containing fifty-three species), together with the addition of ten new species subsequently described in our Transactions and Proceedings, and seventeen new species in the Proceedings of the Linnæan Society, I am able by the exertions of several friends to extend the limits of the family still further; and now that the natural habits of the insects have been discovered, there is likely—to use a very poor pun—to be no pause in the discovery of new species of *Paussidæ*. Major Champion, for instance, discovered several specimens belonging to two distinct new species under a single stone at Hong Kong, and Mr. Benson found so many specimens of *P. Parrianus* in their natural haunts at the Cape of Good Hope, that he was able at leisure to watch their habits in detail. (See Trans. Ent. Soc. vol. v. p. 30.)

The species recently described, and those now for the first time noticed, form portions of collections made by different collectors in various parts of Asia, Africa and Australia. Of these a consi-

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derable number from the Port Natal country were communicated to me by the late A. Melly, Esq., who received them from the Royal Museum of Berlin. Others from the same locality were contained in the fine collection recently sold by auction in this country, and four of the new species, also from Natal, described in the present paper, have been communicated to me recently by Herr Dohrn, the worthy President of the Entomological Society of Stettin. Among the insects from Angola recently arrived in Paris were also several fine species now in the collection of the Marquis de la Ferté-Senectere, who kindly forwarded them to me for description. M. Deyrolle has also obtained another species from the same country, and three species have been received from Eastern Africa (Abyssinia and Nubia). Several fine species from South Australia have been sent me by C. A. Wilson, Esq., one of them being the largest insect in the family, and which I have inscribed with his name. I have also given descriptions of three species collected at Hong Kong by J. C. Bowring, Esq., and Major Champion, now deposited in the British Museum. The fine series of species formed in India by Captain Boys, several of which were described by him in the Journal of the Asiatic Society of Bengal, was also placed in my hands for examination by that gentleman previous to his again quitting England for India, by which means I was able to determine the species. Dr. Bacon's Collection also, which contained several species described by Mr. Benson in M'Clelland's Calcutta Journal of Natural History for 1845, was also submitted to me for examination previous to its sale to M. Deyrolle. Captain Boys' collection was sold by auction, but his types were purchased by various English collectors, chiefly Messrs. Melly, Hope and Saunders.

In addition to the recent notes on the habits of these insects, which I have published in the "Arcana Entomologica" and Transactions of the Entomological Society, those of Dr. Benson published in our Transactions, vol. v. p. 30, and those of Herr Guenzius, published in the Stettin "Zeitung," 1851, p. 227, of which a translation was given by Mr. Douglas in our "Proceedings," 1851, p. 105, Mr. Bowring has favoured me with the following particulars relative to the captures of the three species near Hong Kong, which correspond very nearly with what has been elsewhere observed of the habits of these insects, leading to the conclusion that the number of the species is very much greater than has hitherto been supposed, the rarity of the specimens (and it is a remarkable circumstance that at least half the species are known only by single individuals) being caused by their obscure underground habits.

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Mr. Bowring observes that "all the three species were originally discovered by Major Champion (a very zealous entomologist, who has formed considerable collections both in the neighbourhood of Hong Kong and in Ceylon) on Victoria Peak, under stones in the nests of a minute species of ant, the whole being found in one morning, two specimens of one and three of another species being taken under the same stone; and on a subsequent occasion, while entomologizing on the same mountain with that gentleman, I was fortunate enough to capture a pair of the species named by him *P. sinicus*, also in an ant's nest. Major Champion had previously mentioned to me that he thought he had observed something like crepitation in this insect; and in the present instance this was confirmed, for on the capture of one of the specimens I distinctly heard a noise resembling the ticking of a watch, and my finger was immediately discoloured as by the discharge of a *Brachinus*. Considering the locality where these insects are found, it does not appear probable that they are lignivorous, as has been supposed, and further observation will no doubt prove their affinity to the carnivorous *Carabidæ*. The pair I took I kept alive for some time, but without discovering their proper food. I am indebted to the liberality of Major Champion for specimens of the remaining two species, of which one is unique."

The opportunities recently afforded me of determining the synonymy of several of the species, have induced me to give a complete list of the family, thereby showing the great increase which it has undergone since the last summary which I published in 1845. The number of species now known is not less than eighty-five, one or two only of which are doubtful. Of these six are now for the first time described.

The following Synopsis of the Family embraces all the Species described up to the present time (November, 1852).

Family PAUSSIDÆ, Westw.

Genus 1. CERAPTERUS, Swederus.

Subgenus 1. CERAPTERUS proper.

1. *Cerapterus latipes*, Swederus, Kongl. Vet. t. 9, 1788, p. 203, pl. 6, f. 1; Westw. Linn. T. t. 16, p. 669,—t. 18, p. 382; Arc. Ent. 2, p. 6, pl. 49, f. 1; Mac L. Ann. South Afr. pl. 4, fig. inf. sinistr. Ceylon.

2. *Cerapterus Horsfieldii*, Westw. Linn. T. 16, p. 672,—18, p. 583; Arc. Ent. 2, p. 7, pl. 49, f. 2; Mac L. Ann. So. Afr. pl. 4, fig. sup. dext. Java.

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3. *Cerapterus quadrimaculatus*, Westw. Linn. T. 18, p. 583; Arc. Ent. 2, p. 7, pl. 49, f. 3. Java.

Subgenus 2. ORTHOPTERUS, Westw. Ent. Mag.

4. *Cerapterus* (*Orthopterus*) *Smithii*, Mac Leay, Ann. So.. Afr. p. 74, pl. 4, fig. sup. sinistr.; Westw. Linn. T. 18, p. 583; Ent. Mag. 5, p. 502 ; Arc. Ent. 2, p. 7, pl. 49, f. 4. South Africa.

5. *Cerapterus* (*Orthopterus*) *concolor*. Westw. Proc. Linn. S. 19 June, 1849. Vix *C. Smithii* var. Natal.

6. *Cerapterus* (*Orthopterus*) *La-Fertei*, Westw. Proc. Linn. S. 19 June, 1849. Gambia.

Subgenus 3. ARTHROPTERUS, Mac Leay.

7. *Cerapterus* (*Arthropterus*) *Wilsoni*, Westw. Proc. Linn. S. 19 June, 1849. Adelaide.

8. *Cerapterus* (*Arthropterus*) *Mac-Leaii*, Donovan, Ins. N. Holl. pl. 3; Mac L. Ann. So. Afr. pl. 4, fig. inf. dext.; Westw. Linn. T. 16, p. 672,—18, p. 384; Ent. Mag. 5, p. 503; Arc. Ent. 2, p. 8, pl. 50, f. 4. New Holland.

9. *Cerapterus* (*Arthropterus*) *parallelocerus*, Westw. Proc. Linn. Soc. 5 Nov. 1850, and in Annals Nat. Hist. 7, p. 491 (1851). Australasia.

10. *Cerapterus* (*Arthropterus*) *brevis*, Westw. Proceed. Linn. Soc. 5 Nov. 1850, and in Annals Nat. Hist. 7, p. 491 (1851). Australasia.

11. *Cerapterus* (*Arthropterus*) *Hopii*, Westw. Arc. Ent. 2, p. 8, pl. 50, f. 5. New Holland, Port Philip, &c.

12. *Cerapterus* (*Arthropterus*) *subsulcatus*, Westw. Proc. Linn. S. 19 June, 1849. King George's Sound.

13. *Cerapterus* (*Arthropterus*) *denudatus*, Westw. Proc. Linn. S. 19 June, 1849. New Holland, near River Mundarra.

Subgenus 4. PHYMATOPTERUS, Westw. Ent. Mag.

14. *Cerapterus* (*Phymatopterus*) *piceus*, Westw. Ent. Mag. 5, p. 503; Linn. Tr. 18, p. 584; Arc. Ent. 2, p. 9, pl. 50, f. 3. *Cerapterus Mac-Leaii*, Westw. Trans. Ent. Soc. 2, p. 95, pl. 10, f. 7. New Holland.

Subgenus 5. HOMOPTERUS, Westw.

15. *Cerapterus* (*Homopterus*) *Brasiliensis*, Westw. Linn. T. 18, pl.

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38, f. C.; Arc. Ent. 2, p. 9, pl. 50, f. 2. Corcovado Mountain, near Rio Janeiro.

Subgenus 6. PLEUROPTERUS, Westw.

16. *Cerapterus* (*Pleuropterus*) *Westermanni*, Westw. Arc. Ent. 2, p. 9, pl. 50, f. 1. Java, Ceylon.

17. *Cerapterus* (*Pleuropterus*) *alternans*, Westw. Proc. Linn. S. 19 June, 1849. Mozambique and Natal.

18. *Cerapterus* (*Pleuropterus*) *hastatus*, Westw. Proc. Linn. Soc. 19 June, 1849. Mozambique.

Genus 2. CERATODERUS, Westw. Proc. Linn. S. 1 June, 1841; Trans. Ent. Soc. 5, p. 23.

19. (1.) *Ceratoderus bifasciatus*, Kollar in Ann. Wien. Mus. 1826, t. 31, f. 7*a*, *b* (*Paussus b.*) Westw. Trans. Ent. Soc. ii. 91, pl. 10, fig. 3; Proc. Linn. S. 1 June, 1841; Arc. Ent. 2, p. 37, pl. 58, f. 1. Ind. Orient.

Genus 3. MERISMODERUS, Westw.

20. (1.) *Merismoderus Bensoni*, Westw. Trans. Ent. Soc. vol. 5, p. 23, pl. 2, f. 2; Cab. Orient. Ent. p. 84, pl. 41, f. 4. Ind. Orient.

Genus 4. PENTAPLATARTHRUS, Westw. Linn. Trans. v. 16.

21. (1.) *Pentaplatarthrus Paussoides*, Westw. Trans. Linn. S. 16, pl. 33, f. 1—14; Arc. Ent. pl. 2, p. 38, pl. 58, f. 2.
Var. *Pentaplatarthrus Natalensis*, Mus. Berol.
South Africa, Natal.

Genus 5. LEBIODERUS, Westw. Trans. Ent. Soc. v. ii.

22. (1.) *Lebioderus Gorii*, Westw. Trans. Ent. Soc. ii. pl. 9, f. 8; Arc. Ent. 2, p. 39, pl. 58, f. 3. Java.

Genus 6. HYLOTORUS, Dalm.

23. (1.) *Hylotorus bucephalus*, Gyllenhal in Sch. Syn. Ins. 1, p. 3, App. p. 15, pl. 6, fig. 2; Dalm. Anal. Ent. p. 103; Westw. Trans. Linn. Soc. 10, p. 654; Arc. Ent. 2, p. 40, pl. 58, f. 4. Sierra Leone.

Genus 7. PLATYRHOPALUS, Westw. Trans. Linn. S. v. 16.

24. (1.) *Platyrhopalus denticornis*, Donov. Ins. Ind. pl. 5, f. 1 *Paussus d.*); Westw. Trans. L. S. v. 16, p. 657, tab.

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33, f. 43—48,—v. 19, p. 50; Arc. Ent. 2, p. 77, pl. 68, f. 1; Burmeister, in Guér. Mag. Zool. 1841, Ins. pl. 76, f. 2. Ind. Orient.

25. (2.) *Platyrhopalus Westwoodii*, Saunders in Trans. Ent. Soc. ii. 84, pl. 10, fig. 5; Westw. in Trans. Linn. Soc. 19, p. 51; Arc. Ent. 2, p. 78, pl. 68, f. 2. Ind. Orient.

26. (3.) *Platyrhopalus intermedius*, Benson in M'Clelland's Calcutta Journ. Nat. Hist. 1845; Westw. Trans. Ent. Soc. 5, p. 25. Ind. Orient.

27. (4.) *Platyrhopalus angustus*, Westw. Arc. Ent. 2, p. 78, pl. 68, f. 3; Boys in Journ. Asiat. Soc. Bengal. n. ser. n. 54, sp. 2.
Platyrh. suturalis, Westw. Arc. Ent. 2, p. 161, and see p. 190, note, pl. 88, f. 1, 1*a*. Ind. Orient.

28. (5.) *Platyrhopalus acutidens*, Westw. Trans. Linn. Soc. 16, p. 66, pl. 33, fig. 50—19, p. 51; Arc. Ent. 2, p. 79. Ind. Orient.

29. (6.) *Platyrhopalus unicolor*, Westw. Trans. Linn. Soc. 16, p. 659; Arc. Ent. ii. p. 79.
Paussus denticornis, Megerle, Ill. Mag. 3, p. 113, not.; Gyllenhal in Schönh. Syn. Ins. 1, part iii. App. 14, tab. 6, f. 1,—p. 19, No. 5.
An var. *Pl. denticornis*, Donovan?
Ind. Orient.

30. (7.) *Platyrhopalus Mellii*, Westw. Trans. Linn. S. 16, p. 685; Trans. Ent. Soc. 2, pl. 10, f. 4; Arc. Ent. 2, p. 162, pl. 88, f. 2; Guérin, Icon. R. An. Ins. pl. 40, f. 11. Malabar.

31. (8.) *Platyrhopalus aplustrifer*, Westw. Trans. Linn. Soc. 16, p. 664, pl. 33, f. 51; Arc. Ent. 2, p. 163, pl. 88, f. 3. Bengal.

Genus 8. Paussus, Linn.

Sect. A. Prothorax quasi bipartitus.

Subsect. a. Antennarum clava postice haud excavata.

32. (1.) *Paussus microcephalus*, Linnæus, Dissert. big. Ins. tab. ann. f. 6—10; Afzelius, Trans. Lin. Soc. vol. iv. pl. 22, f. 1—5; Westw. Trans. Linn. Soc. 16, p. 631, pl. 33, f. 21; Arc. Ent. 2, p. 169, pl. 88, f. 4. Africa Occid. tropic.

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33. (2.) *Paussus Jousselinii*, Guérin-Méneville, Revue Zool., No. 2, p. 21. Rangoon.

34. (3.) *Paussus Linnæi*, Westw. Trans. Linn. Soc. 16, p. 634, pl. 33, fig. 22—24; Arc. Ent. 2, p. 170, pl. 89, f. 3. ——?

35. (4.) *Paussus Burmeisteri*, Westw. Trans. Ent. Soc. ii. p. 86, pl. 9, f. 3; Arc. Ent. 2, p. 171, pl. 89, f. 2. Cap. Bon. Spei.

36. (5.) *Paussus rufitarsis*, Westw. Trans. Linn. Soc. 16, p. 638, pl. 33, f. 25—27; Arc. Ent. 2, p. 172, pl. 89, f. 4.
Paussus Baconis, Benson in McClelland's Calcutta Journ. of Nat. Hist. 1845, n. 1; Westw. in Trans. Ent. Soc. 5, p. 24. Ind. Orient.

37. (6.) *Paussus pilicornis*, Donovan, Ins. Ind. pl. 5, f. 4; Westw. Trans. Linn. Soc. 16, p. 643, pl. 33, f. 34; Arc. Ent. 2, p. 173, pl. 89, f. 1. Bengal.

38. (7.) *Paussus Sinicus* (Champion, MS.), Westw. Proc. Linn. Soc. 19 June, 1849. Hong Kong.

39. (8.) *Paussus granulatus*, Westw. Proc. Linn. Soc. 19 June, 1849. Natal.

40. (9.) *Paussus Humboldtii* (Dohrn. MS.), n. s.

P. prothorace bipartito, antennarum clava postice haud excavata, piceus, elytris metasterno et ventre castaneis; nitidus, capite lævi, vertice in tuberculum crassum conicum, apice obtusum producto, antennarum clava crassa, ovali, glabra, basi oblique truncata et supra in cornu breve conicum paullo curvatum sensim producta, disco supra et infra convexo, apice rotundato, margine antico acuto, postico vero rotundato; palpis maxillaribus articulis 2, 3 et 4 sensim magnitudine decrescentibus; labialibus filiformibus gracilibus, articulo ultimo longissimo; prothorace capite vix longiori sed evidenter latiori; in partibus duabus magnitudine et latitudine fere æqualibus diviso, partis anticæ margine antico fere recto, angulis lateralibus rotundatis, lateribusque obliquis, disco transversim elevato et in medio paullo depresso, fossula media transversa profunda, partis posticæ lateribus rotundatis, disco in medio longitudinaliter subdepresso; elytris latis, vage punctatis et breviter luteo-parum setosis; pedibus mediocribus, tibiis compressis; podice plano, margine tenui elevato.

Long. corp. lin. 5.

Habitat in Natalia. In Mus. Dohrn.

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41. (10.) *Paussus Turcicus*, Fridvaldszky in Hungar. Trans. v. 2 (1835), pl. 6, f. 5; Westw. Trans. Ent. Soc. 2, p. 91; Arc. Ent. 2, p. 174, pl. 88, f. 5. Turkey, Balkan Mountains.

Subsect. b. Antennarum clava postice excavata.

Divis.* Species Asiaticæ.

42. (11.) *Paussus tibialis*, Westw. Trans. Linn. Soc. 19, p. 47; Arc. Ent. 2, p. 174, pl. 90, f. 1. Bengal.

43. (12.) *Paussus fulvus*, Westw. Trans. Linn. Soc. 19, p. 47; Arc. Ent. 2, p. 175, pl. 90, f. 3. Ind. Orient.

44. (13.) *Paussus Stevensianus*, Westw. in Trans. Linn. Soc. 19, p. 48; Arc. Ent. 2, p. 176, pl. 90, f. 2. Ind. Orient.

45. (14.) *Paussus hystrix* (Champ. MS.), Westw. in Proc. Linn. Soc. 19 June, 1849. Hong Kong.

46. (15.) *Paussus Boysii*, Westw. Arc. Ent. 2, p. 177, pl. 92, f. 2, and pl. 90, f. 6.
Paussus, No. 6, Boys in Journ. Asiat. Soc. Bengal. N. S. No. 54, p. 433, tab. ann. f. 6. Ind. Orient.

47. (16.) *Paussus denticulatus*, Westw. Arc. Ent. 2, p. 179, pl. 92, f. 1, and pl. 90, f. 17.
Paussus, No. 1, Boys in Journ. Asiat. Soc. Bengal, N. S. No. 54, p. 426, tab. ann. f. 1. Ind. Orient.

48. (17.) *Paussus Bowringii* (Champ. MS.), Westw. in Proc. Linn. Soc. June 19, 1849. Hong Kong.

49. (18.) *Paussus politus*, Westw. in Proc. Linn. Soc. June 19, 1849. Ind. Orient.

50. (19.) *Paussus Nauceras*, Benson in M'Clelland's Calcutta Journal, Nat. Hist. 1845; Westw. in Trans. Ent. Soc. 5, p. 25. Ind. Orient.

51. (20.) *Paussus phloiophorus*, Benson in M'Clelland's Calcutta Journal, Nat. Hist. 1845; West. in Trans. Ent. Soc. 5, p. 25. Ind. Orient.

52. (21.) *Paussus Jerdani*, (Hope, MS.) Westw. Trans. Ent. Soc. 5, p. 26, pl. 2, f. 1; Cab. Orient. Ent. p. 84, pl. 41, f. 5. Ind. Orient.

53. (22.) *Paussus thoracicus*, Donovan, Ins. Ind. pl. 4, fig. 2; Westw. Trans. Linn. Soc. 16, p. 640, pl. 33, f. 28—30; Arc. Ent. 2, p. 180, pl. 90, f. 4.

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Paussus trigonicornis, Latreille, Gen. Crust. &c. iii. p. 3, pl. 11, f. 8. Ind. Orient.

54. (23.) *Paussus Fichtelii*, Donovan, Ins. Ind. pl. 4, f. 3; Westw. Trans. Linn. Soc. 16, p. 641, pl. 33, f. 31—33; Arc. Ent. 2, p. 181, pl. 90, f. 5, 8, 9; Saunders in Trans. Ent. Soc. ii. p. 83, pl. 9, f. 1; Boys in Journ. of Asiat. Soc. Bengal. N. S. No. 54, p. 429 and tab. ann. fig. 4 and 5. Ind. Orient.

Divis. ** Species Africanæ.

55. (24.) *Paussus excavatus*, Westw. Trans. Linn. Soc. 16, p. 637, pl. 33, f. 60—61; Arc. Ent. 2, p. 182, pl. 91, f. 2.
Paussus crepitans, Dupont, MS. Senegal.

56. (25.) *Paussus Audouinii*, Westw. n. sp.

P. prothorace subbipartito, antennarum clava postice excavata; totus piceus, sublævis, parum nitidus, punctis minutissimis setulosis vagis; capite subquadrato, antice in medio angulato-emarginato, vertice convexo, punctis duobus profundis inter partem anticam oculorum, inter se et oculos æquidistantibus; antennarum clava capite majori, oblonga, apice rotundato, fere plana, margine postico parum crassiori oblique excavato, excavatione in fossulas sex divisa, margine supero-postico recto, infero-postico parum sinuato, disco punctatissimo; pronoti parte antica capite e quarta parte latiori, lateribus recte angulatis, disco postice elevato, in medio autem impresso; parte postica e præcedenti fossula profunda setosa separata, angustiori, capite fere æquali; breviter cordato-truncata, in medio profunde impressa, lateribus in discum angulato-elevatis, medio postice in lobos duos ovales elevato; elytris pronoti parte antica latioribus, postice sensim paullo latioribus, apice recte truncatis, podice lævi plano, margine omni tenui elevato luteo-setoso; pedibus latis, valde compressis, tibiis fere triangularibus, palpis maxillaribus articulo 2ndo ovato compresso; corpore infra nigro, metasterno et ventre rufis, hujus segmento ultimo nigro.

Long. corp. lin. 3.

Habitat in Benguela Africæ occid. tropicalis.

In Mus. Jekel, Parisiis.

57. (26.) *Paussus ruber*, Thunberg, Act. Holm. 1781, p. 170, n. 1; Afzelius, Trans. Linn. Soc. 4, p. 272; Westw. Trans. Linn. Soc. 16, p. 635; Trans. Ent. Soc. 2, p. 81, pl. 9, f. 5; Arc. Ent. 2, p. 183, pl. 91, f. 1. Cap. Bonæ Spei.

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58. (27.) *Paussus cucullatus*, Westw. Proc. Linn. Soc. 19 June, 1849. Natal.

59. (28.) *Paussus cochlearius*, Westw. Trans. Ent. Soc. 2, p. 88, pl. 9, f. 6; Arc. Ent. 2, p. 183, pl. 91, f. 3. Cap. Bonæ Spei.

60. (29.) *Paussus Dohrnii*, West., n. sp.

P. prothorace bipartito, antennarum clava postice excavata; totus fusco-castaneus, elytris magis castaneis, setulis brevissimis luteis sparsim obsitus; capite convexo, antice punctato, emarginato, inter partem anticam oculorum spina conica obtusa armato, collo angusto lævi; antennarum clava subovata, utrinque convexa, tenuissime punctata, setosa, basi supra in spinam obtusam producto, apice parum angustato et recurvo, margine supero excavato, marginibus canalis parum sinuato-undatis, discoque prope marginem sulcis 4 obliquis; palpis maxillaribus subincrassatis; pronoti parte antica elevata lata punctata, lateribus rotundatis, medio marginis ejus postici parum impresso; parte postica e præcedenti canali profundo intus luteo-setoso separata, medio profunde impresso, lateribus elevatis glabris, utrinque spina brevi armato; elytris latis, subconvexis et suboblongis, punctatis, apice oblique truncato; pedibus sat gracilibus, tibiis subcylindricis, calcari tibiarum brevissimo; corpore infra concolore, tenuissime punctato.

Long. corp. lin. 3½.

Habitat in Natalia Africæ Orientalis. In Mus. Dohrn.

61. (30.) *Paussus Chevrolatii*, Westw. n. sp.

P. prothorace bipartito, antennarum clava vix postice excavata, totus brunneo-rufus, fascia lata media elytrorum nigra, coriaceus subopacus; capite et pronoto punctis minimis elytrisque punctis majoribus setiferis; capite supra fere plano; fossulis duabus parvis rotundis inter partem anticam oculorum, margine antico clypei fere recto acuto, angulis anticis rotundatis; antennarum clava oblonga paullo curvata, dimidio basali depresso, apicali magis convexo, margine antico fere recto acuto, apicali rotundato, acuto, postico inter basin et medio sat profunde emarginato; puncto profundo, prope angulum subobtusum basalem externum, carinaque acuta e puncto versus medium disci extensa et emarginaturæ parallella; palpis maxillaribus articulo 2ndo maximo fere rotundo, subdepresso, 3tio et 4to parvis subæqualibus; palpis labialibus articulo basali minuto, 2ndo rotundato, 3tio magno

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ovali, apice suboblique truncato; prothorace oblongo, angulis lateralibus partis anticæ capite latioribus obtusis, parte postica capitis latitudine; fossula profunda media oblonga utrinque ad basin luteo-setosa, carinaque parva longitudinali utrinque notata; elytris capite multo latioribus, humeris rotundatis; pedibus gracilibus elongatis.

Long. corp. lin. 2.

Habitat in Abyssinia. In Mus. Chevrolat.

62. (31.) *Paussus Parrianus*, Westw. in Trans. Ent. Soc. 5, p. 29, pl. 2, f. 3. Cap. Bon. Spei.

63. (32.) *Paussus Germari*, Westw. n. sp.

P. prothorace bipartito, antennarum clava elongata subensata, canali tenuissimo longitudinali in margine supero (vel postico); supra testaceus, obscurus; elytris (basi excepto) nigris; totus granuloso-coriaceus; capite antice subquadrato, clypeo in medio emarginato, disci medio longitudinaliter late impresso, carinis duabus lateralibus elevatis, alteraque transversa postica, utrinque inter oculos tuberculo elevato oblongo-ovali punctoque postico connexa; antennarum clava valde compressa, sub-elongata, ensem brevem curvatam simulante, basi supra in spinam brevem producto, margine supero in canalem vix distinctum excavato; disco sublævi; palpis maxillaribus articulo 2ndo maximo, valde dilatato, duobus apicalibus minutis subæqualibus; pronoti parte antica capite vix latiori; lateribus subangulatis, carina subacuta media transversa, in medio interrupta, ibique longitudinaliter impressa, biloba; parte postica angustiori e præcedente canali profundo transverso separata, lateribus in discum in tubercula dua angulata nigra nitida elevatis; medio fossula longitudinali centrali impresso; elytris oblongis, pronoto multo latioribus, sub lente granulatis subopacis nigris, basi obscure testaceis, singulo sulcis quinque longitudinalibus parum profundis, setulis minimis luteis obsitis; corpore infra rufo-piceo, nitido; pedibus subelongatis, haud dilatatis, parum compressis, brevius setosis, tibiis ad apicem sensim paullo angustatis, calcari minuto armatis, piceis, tibiis tarsisque magis rufescentibus.

Long. corp. lin. 3.

Habitat in Natalia. In Mus. Dohrn.

64. (33.) *Paussus Schaumii*, Westw.

P. prothorace bipartito, antennarum clava elongata subensata, canali tenuissimo longitudinali marginis postici; fulvus, sub-

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lævis, paullo nitidus, elytris nigris; capite antice angustiori, margine antico in medio emarginato, disco longitudinaliter impresso, punctis duobus profundis inter oculos; pone oculos in collum sensim angustato; antennis et palpis ut in *P. Germari:* pronoto capite latiori, parte antica e collo sensim latiori, lateribus obliquis rectis, disco elevato, in medio bilobo, parte postica præcedente latiori subquadrata glaberrima, e præcedenti sulcis duobus profundis obliquis luteo-setosis separata; lateribus in discum oblique elevatis, fossula centrali longitudinali parum profunda et postice abbreviata; elytris elongatis, fere parallelis, pronoti parte postica haud multo latioribus, humeris valde declivibus; nigris basi fulvis subnitidis, tenuissime punctatis et luteo-breviter setosis; corpore infra fulvo-castaneo nitido, pedibus ut in *P. Germari* formatis; podice glaberrimo, margine omni elevato.

Long. corp, lin. 2⅔.

Habitat in Natalia. In Mus. Dohrn.

65. (34.) *Paussus Klugii*, Westw. Trans. Ent. Soc. 2, p. 85, pl. 9, f. 2; Arc. Ent. 2, p. 183, pl. 91, f. 4. Cap. Bon. Spei.

66. (35.) *Paussus Latreillii*, Westw. Arc. Ent. 2, p. 184, pl. 91, f. 5. Sierra Leona, Senegal.

Sectio B. Prothorax subcontinuus.

Subsectio *a*. Species Africanæ.

67. (36.) *Paussus sphærocerus*, Afzelius, Trans. Linn. Soc. 4, p. 270, pl. 22, f. 2—6; Sturm. Catal. Ins. Samml. pl. 4, f. 31; Westw. Trans. Linn. Soc. 16, pl. 33, f. 35; Arc. Ent. 2, p. 184, pl. 92, f. 3. Sierra Leona.

68. (37.) *Paussus armatus* (Dej.), Westw. Trans. Linn. Soc. 16, p. 645, pl. 33, f. 62—64; Trans. Ent. Soc. 2, p. 89; Arc. Ent. 2, p. 185, pl. 93, f. 1.
Paussus cornutus, Chevrolat in Guérin, Mag. Zool. Ins. pl. 49. Africa Tropic. Occid.

69. (38.) *Paussus cilipes*, Westw. Arc. Ent. 2, p 185, pl. 93, f. 3. Sierra Leona.

70. (39.) *Paussus Æthiops*, Blanchard in Règne Animal, ed. Crochard, Ins. pl. 61, f. 8; Westw. Arc. Ent. 2, p. 186, pl. 93, f. 6. Nubia.

71. (40.) *Paussus verticalis*, Reiche in Append. Voy. Abyssinie de Galinier, p. 390, Zool. pl. 24, f. 5, 5*a*. Abyssinia.

72. (41.) *Paussus dentifrons* (Dej.), Westw. Trans. Linn. Soc. 16,

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p. 662, pl. 33, f. 68—70; Arc. Ent. 2, p. 186, pl. 93, f. 4. Senegal.

73. (42.) *Paussus curvicornis*, Chevrolat in Silberm. Rev. Ent. 4, p. 263; Guérin, Icon. Règne An. Ins. pl. 40, f. 8; Westw. Arc. Ent. 2, p. 187, pl. 93, f. 5.
Paussus cornutus, var. Chevrolat in Guérin, Mag. Zool. No. 49, fig. 1 *a*, 2, 2 *a*. Senegal.

74. (43.) *Paussus spinicoxis*, Westw. Proc. Linn. Soc. June 19, 1849. Natal.

75. (44.) *Paussus cultratus*, Westw. Proc. Linn. Soc. June 19, 1849. Natal.

76. (45.) *Paussus setosus*, Westw. Proc. Linn. Soc. June 19, 1849. Guinea.

77. (46.) *Paussus lævifrons* (Dej.), Westw. Trans. Linn. Soc. 16, p. 661, pl. 33, fig. 65—67; Arc. Ent. 2, p. 187, pl. 92, f. 4. Senegal.

78. (47.) *Paussus Shuckardii*, Westw. Arc. Ent. 2, p. 187, pl. 92, f. 5. Africa Austral.

79. (48.) *Paussus lineatus*, Thunberg, Act. Holm. 1781, p. 171, pl. 3, f. 4, 5; Fabricius, Syst. Eleuth. 2, 75; Westw. Trans. Linn. Soc. 16, p. 647; Arc. Ent. 2, p. 188, pl. 94, f. 1. Cap. Bon. Spei.

80. (49.) *Paussus affinis*, Westw. Trans. Linn. Soc. 16, p. 646, pl. 33, f. 36, 37; Arc. Ent. 2, p. 188, pl. 94, f. 2. ——?

81. (50.) *Paussus Favieri*, Léon Fairmaire in Ann. Soc. Ent. France, 2 ser. t. 10 (1852), p. 76, pl. 3, f. 4. Tangier.

Subsect. b. Species Asiaticæ.

82. (51.) *Paussus cognatus*, Westw. Arc. Ent. 2, p. 189, pl. 94, f. 3. India Orient.

83. (52.) *Paussus Hearseianus*, Westw. Proc. Linn. Soc. April 19, 1842; Boys in Journ. Asiatic. Soc. Bengal, N. S. No. 54, p. 422 (No. 31), tab. ann. f. 3; Westw. Arc. Ent. 2, p. 189, pl. 94, f. 4. Ind. Orient.

84. (53.) *Paussus Hardwickii*, Westw. Trans. Linn. Soc. 16, p. 649, pl. 33, fig. 39, 40; Arc. Ent. 2, p. 189, pl. 94, f. 5; Boys in Journ. Asiat. Soc. Bengal, N.S. No. 54, p. 434 (No. 8), and tab. ann. f. 8. Nepaul, Almorich.

85. (54.) *Paussus Saundersii*, Westw.; Arc. Ent. 2, p. 190, pl. 94, f. 6. India Orient.

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XV. *On the Identification of the yet undetermined Species of* Microlepidoptera, *mentioned in the "Mémoires" of Réaumur. By* J. W. Douglas, Esq.

[Read 4th October, 1852.]

The Memoirs of Réaumur and De Geer contain a fund of useful information respecting the food, times of appearance, and habits of insects, but as in neither work the species bear scientific names, an unassisted reader is rather doubtful what particular species are alluded to. The determination of such species of *Tineidæ* as our present knowledge enables us to make will therefore be interesting to the Micro-Lepidopterist of the present day, though many species will still remain unrecognized.

The progress that has been made in the investigation of these small tribes, since the publication in the "Isis," 1838, of Zeller's elaborate review of the *Lepidoptera* mentioned by Réaumur, enables us to correct many errors into which he fell from the then deficient state of knowledge.

In order to make fully intelligible the following notes on Réaumur's observations on Lepidopterous larvæ mining in leaves of plants, it was necessary to translate the whole of those which occur in his first memoir of the third volume. The accuracy of these notices, and the fact that they are nearly unknown to English collectors, would be additional reasons, if any were required, for occupying therewith so much valuable space.

Special reasons are given, in some instances, for coming to a conclusion different from that at which Zeller arrived, in 1838.

Zeller's Memoir was the result of an offer by the "Isis von Oken" of a prize for the best discriminative essay on the subject of the Lepidopterous insects in Réaumur's works; of those submitted in competition, it obtained the first place; and it is very desirable to follow up, from time to time, as our knowledge increases, a work so well begun.

The idea of so doing is due to Mr. Stainton, who also has furnished rough notes of the following matter, which his present avocations have not left time for him to put into form, a work I have endeavoured to do, at his request, adding here and there a few remarks.

Réaumur, Vol. 3, Mem. I.

On the Larvæ which mine in the Leaves of Plants.

"Of all kinds of caterpillars which live in the interior of some

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parts of plants, the smallest are those which find sufficient accommodation in the interior of leaves, and even in the thinnest. These insects insinuate themselves and form paths between the upper and under skins of the leaves, where they are well sheltered; they mine in the fleshy substance of the leaf and loosen the parenchyma; no rubbish from the space that they enlarge inconveniences them; they eat all that they loosen, and so their labour answers two purposes; for at the same time that they are enlarging their habitation they are procuring their food.

"The insects which mine in leaves, though small, are easily found. One needs only to see the outside of a leaf, to know whether there is a mining larva within; though green and healthy every where else, it is dried up, yellowish, whitish, or at least of a different hue from the rest, at the places which the insect occupies, or has inhabited. The form of these mined places shows us that these insects have three different ways of conducting their labours in the interior of leaves. Some form only narrow, long, and tortuous galleries, the forms of which are extremely irregular; others, wishing to have more room, mine irregular, oblong, larger places; and others, which when young have mined in galleries, when full grown mine in large patches."

Note.—Those larvæ living in galleries are all, as far as we are at present informed, of the genus *Nepticula*; possibly *Trifurcula* also mines in galleries, but that is not yet ascertained, no species of the latter genus having been bred. The gallery of a *Nepticula* may, I believe, be always distinguished from that of a Dipterous larva by the excrement forming an uninterrupted line; in the galleries mined by Dipterous larvæ, the excrement is scattered here and there, as may be easily seen in the leaves of buttercup, holly, honeysuckle, meadowsweet, &c. &c.

"Although the class of insects which mine in leaves has as yet (1737) been little observed, it already includes a great number of species. There are few trees or plants, if there are any, that are not attacked by some mining larva. There are even miners of different species in the leaves of the same plant or tree; and we see not only the different leaves of an apple tree, but even one leaf of the same tree, mined both in galleries and blotches. Probably the same tree furnishes food to gallery-miners and blotch-miners of several species."

Note.—I have in one apple leaf observed several larvæ of each of the three species, *Lithocolletis Pomifoliella*, *Cemiostoma scitella* and *Nepticula* .....?

"It is sometimes difficult to perceive in what these species of such small insects differ from each other; besides, it is not cer-

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tain that the insects that mine in the leaves of different plants are always those of different species. Yet, as miners of different species and different genera feed in the same leaf, it is very probable that there are as many or more species of insects mining in leaves, as there are species of trees and plants."

Note.—It is true that this is not certain, but excepting in the case of closely allied plants, the probability is that each species of plant nourishes a different species of moth.

"The greater part of these mining larvæ live entirely alone; each gallery and blotched place being the habitation of only a single larva, which has no communication with those of other insects of the same or different species, though made in the same leaf. There are, however, leaf miners, which having passed a large portion of their life in solitude, meet when the period of their metamorphosis approaches. After living till then in narrow galleries, they wish for more spacious dwellings, and mine together in blotches. It is not difficult to find oak leaves, before the end of spring, in which are several narrow and tortuous galleries, which all converge and terminate in a whitish blotch, which is sometimes half as large as the leaf (*Coriscium substriga*). The upper epidermis of this leaf has been loosened by several little caterpillars, for which it forms a closed tent, under which they eat the fleshy substance of the leaf without fear of interruption; at first they had each lived separately in narrow paths.

"There are also miners which from their birth are in companies of twenty or thirty in the same blotch, which they enlarge daily as they feed. Such societies are found in the leaves of lilac (*Gracillaria Syringella*); the caterpillars are white and smooth; they have six true legs, but no prolegs; their anal segment helps them to walk, and serves as a seventh leg."

Note.—It is only when young that the larvæ of *Gracillaria Syringella* have no prolegs; when fully grown, they have fourteen legs, as other larvæ of the genus.

"Among the mining caterpillars, it is easy to recognise the characters of two different classes; there are some with sixteen legs; others have only fourteen legs, having only six ventral prolegs; the first pair of prolegs is only separated from the last pair of true legs by two segments without legs. Probably there are several other classes.

"Among the mining larvæ, some, except in size, are very similar to ordinary smooth caterpillars; but others have the segments more marked, more indented than those of ordinary caterpillars; the bodies of some, and especially the posterior portion, seem composed of beads, threaded like those of necklaces. The

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anterior segments are more flattened; the second or third is the broadest of all; hence it follows that the anterior portion of the body forms a kind of isosceles triangle. The second segment of some seems widened by two appendages, portions of spheres that have been added on each side; this may be observed in the larva which mines the leaves of the rose in blotches. But what appears most remarkable is, that one seems to perceive on each of those parts that extends beyond the others a fissure which can only be a stigma or organ of respiration; thus these stigmata are placed much nearer the middle of the back than in ordinary caterpillars."

Note.—The breadth of the second and third segment is very striking in most of the larvæ of the genus *Lithocolletis*.

Note.—The larva which mines the leaves of the rose in blotches is unknown to me. *Coleophora Lusciniæpennella*, it is true, makes blotches on the leaves, but so accurate an observer as Réaumur would never have mistaken a *Coleophora* for a miner; and it is remarkable that he repeatedly mentions this rose miner, and in one place states that there are no shrubs on which blotch miners are more common than the roses; this larva was an *incognita* to Zeller, in 1838, and still remains lost to us. Whether the species be really extinct, or only wants looking for, time must prove. But although we do not know this species, I think we know what is intended by the widening of the anterior segments by an appendage like a portion of a sphere, for in a larva mining the leaves of black thorn, the black head deeply set into and working up under the wide and pale next segment, imparts thereto its own colour, and makes the rounded sides of this segment, which project beyond the sides of the inserted head, look like semi-spherical appendages.

"All these mining larvæ have a tender, transparent, and smooth skin, but all are not of the same colour; the greater part, however, are whitish, or greenish white; some are of a pale flesh colour, and others of a deeper flesh colour, approaching to red.

"There are also a great many species which are of a beautiful yellow, resembling the colour of amber: this is the colour of the blotch miners of the apple tree (no doubt *Lithocolletis Pomifoliella*, the colour well agrees) and also of the gallery-miners in the leaves of the bramble (*Nepticula aurella*). A blotch miner of rose-leaves, already mentioned, is of a greyish olive. Commonly, these colours are not clouded, varied and combined by spots and rays as are those of many caterpillars which feed on leaves. However, we find in the leaves of the goose-foot and orach a larva mining in blotches, which, if as large as common caterpillars, might be

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put among the well-coloured ones. The ground colour is a yellowish white, but all along the back is a reddish-brown stripe, and on each side are two rows of spots, redder than the dorsal stripe, and well defined, one spot being placed directly above the other on each segment."

Note.—Gelechia næviferella is here alluded to, and not *G. Hermannella*, as Zeller, in 1838, had imagined. *Hermannella* makes a green blotch, afterwards becoming yellowish, but *nævíferella* an extremely white and transparent one; the description of the larva agrees well with that of *nævíferella*, but not, as Zeller had remarked, with that of *G. Hermannella*.

"The place at which a gallery miner (just emerged from the egg) has entered a leaf is easy to recognize; it is so narrow as to be hardly as wide as the finest thread; but the path gradually widens, and at the other end is nearly as wide as a narrow riband; for by degrees, as the miner excavates and opens out a road before him, he eats and grows, the diameter of his body increases, and requires a wider habitation. If we take a leaf mined in this way, and hold it up to a light, or better still, to the sun, such places being transparent, we shall not fail to see the insect, if indeed it has not already quitted the leaf; and its head will be always at the broadest end of the gallery. In the entire space which it has previously inhabited (*Nepticula*), we observe little black grains, which are nothing but the excrement it has made on its road. These grains are placed in a row behind one another, but in the wider galleries there are several rows placed side by side. In the leaves mined in blotches, the excrements are all collected in a little heap; some species place them in the centre of the mined place, and others in a corner.

"If, when we examine the mining larva, it happens to be at work, we shall see it seize between its teeth, as between pincers, and detach the parenchyma of the leaf; or at least we shall perceive that a part of the leaf previously opaque has become transparent, because the fleshy portion has passed into the body of the insect. The two jaws, which form a point in front of the head, are well fitted to open a road in the substance of the leaf and to seize minute portions. One can very easily observe the blotch miner of the rose, while excavating in the thickness of the leaf(?) We observe still more easily that of the goosefoot, or orach, because in the places which it mines it only leaves a white and very fine skin (*G. nævíferella*).

"The labours of the blotch miners, roughly considered, seem to have in them nothing more singular than those of the gallery miners, except that whereas the latter always mine before them,

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and advance as they mine, the former mine all round the place they inhabit; this place is marked on the leaf by a white or yellowish blotch, being in fact the portion of the leaf that has been detached. Had this portion been simply loosened, it should be every where even and smooth, as when it was attached; consequently, it appeared to me very singular, when for the first time I observed on a portion of the membrane of an oak leaf a ridge (*arrête*) projecting above, which went from one end of the mined place to the end diametrically opposite. It was at first natural to suppose that this ridge was nothing but a large fibre loosened from the leaf; but its direction and figure destroyed this idea, and showed that it was not a fibre of the plant. I have since constantly observed this ridge on all portions of the epidermis which had been separated from the parenchyma of the oak leaves by certain species of miners, and I was puzzled how it could be produced, till I observed the mined blotches in apple and elm leaves. These mined places showed me why the loosened epidermis of certain oak leaves has a ridge, what is the use of this ridge, and how it may be formed. The elm leaf miners (*Lithocolletis Schreberella*) are of the largest insects of this kind, yet the space included between two parallel fibres which start from the mid rib bound the space in which each excavates and feeds; these fibres are for it two chains of mountains, which stop it on each side; hence it makes its abode longer than broad, somewhat oblong. It is the lower epidermis of the leaf which it first loosens, and it afterwards eats all the pulp that is between this and the upper epidermis. Instead of one ridge, such as I had seen on the oak leaves, I have often seen two or three, and sometimes more, on the loosened epidermis of an elm leaf. The structure of each of these was easier to recognize than that of those of the oak; it was evident that each was only a fold of the epidermis, and that the summit of the fold which rose above the rest formed the ridge in question; this was shown in tracing each ridge from one end to the other, because towards one end were seen the two portions of the epidermis which began to curve towards each other, and a little further they were almost contiguous, whence it was easy to judge that in the rest of their extent they were applied *exactly one against the other*.

"The effect produced by these folds of the membrane is evident, they contract it, and consequently force the fibres to which it is attached to approach each other; the opposite membrane on which the substance of the leaf rests is also thereby compelled to curve and become convex on the outside of the leaf. The advantage to the insect is apparent; it obtains a tenement of greater

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height, it forms a cavity proportioned to its size, and the movements it has to make; the membrane no longer rests on its body, as it otherwise continually would, and it has no longer so many rubbings to fear.

"Nothing is more confirmatory of the idea that this is the true use of the folds in the epidermis of the leaf, than the form that our blotch miners cause the apple leaves in which they reside to assume. Above the places where they reside we observe folds similar to those of the elm, but often there are more; on the loosened side of the epidermis, which is here generally the upper (*Lithocolletis Corylifoliella*?) two parts of the leaf, which in their natural position were seven or eight lines asunder, are sometimes brought so close together as almost to touch: there the folds of the epidermis have been so multiplied, so squeezed together, that it only retains a small portion of its first extent of surface, but the insect has thereby obtained a deeper cavity in which to live. The time when the miners of this species are most numerous, and when their labours on the apple leaves are most advanced, is when the latter are ready to fall, that is, towards the middle or end of October; if we then observe those leaves which more than others are folded along the principal nervure, or which appear folded in some other places, that part where the fold is most considerable is the abode of the insect. We often find two or three similar abodes on the same leaf. Some insects take up their quarters on the under side (*Lithocolletis Pomifoliella*), but these are few in number. At the same period we also find most in the elm leaves."

Note.—Réaumur apparently supposed that the larva mining the upper side of the apple leaf was the same as that mining the under side; the whole of our recent experience however shows us that the same species keeps constantly to the same side of the leaf, and consequently an upper side miner cannot be specifically identical with an under side miner. I am not aware that the larva from the upper side of the apple leaf has yet been bred; it is probably identical with the larva of the upper side of the hawthorn leaf (*Lithocolletis Corylifoliella*, Haw.). Here it is not nearly so common as the larva of the under side of the leaf (*L. Pomifoliella*).

"The three kinds of miners of which we have spoken—those of the oak, those of the elm, and those of the apple—are larvæ with fourteen legs, and which have only six ventral prolegs, so placed that between these and the anal prolegs are three segments without legs. The miners of the apple leaf are of a yellow, approaching to amber; the miners of the oak leaf are white, slightly

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tinted with greenish; the colour of the contents of their stomach and intestines may probably give this tint to their transparent skin. It would not be safe to decide that these three larvæ belong to the same or different species, if the insects into which they changed did not show it, and if we could not say that the mode of preparing for their metamorphosis is different. If in the month of October we remove the epidermis that has been folded by one of the apple leaf miners, we find a chrysalis which has not been enclosed in a cocoon. If at the same time we open the mined part of an oak leaf we also find a chrysalis, but enclosed in a small cocoon of fine white silk, to fortify which the larva has covered the exterior with its excrement."

Note.—It is not possible to identify with precision Réaumur's oak miner; the pupa of several species of *Lithocolletis* that feed on the oak is enclosed in a cocoon covered with excrement as he mentions: his figure of the imago would appear to indicate *L. Cramerella*.

"Finally, if we open the mined part of the elm leaf we find a very small but pretty silky cocoon, which has on a small scale the form of the cocoon of the silkworm; it is however rather more elongated and more pointed. The colour of the silk of these cocoons is not of the ordinary colour, it is of a bluish-green."

Note.—Zeller had here suspected *Lithocolletis Kleemannella*, but the proofs are so strong for *Schreberella* that I have no hesitation in pronouncing that to be the species, the greenish-blue cocoon giving a climax to this supposition.

"Among the miners of which we speak some go into pupa in June or July, and it was only to point out the time when most are to be found, that we said they should be looked for towards the end of October; when the leaves fall, the chrysalides which are in the leaves fall with them. Those which are enclosed in cocoons are at least in some degree sheltered, when the leaf decays; I know not whether the others are able to resist moisture, or whether many do not perish during the winter.

"I have omitted to seek for the moth of a miner of the leaves of the pear, which is not so frequent as the miner of the apple leaves. It folds, like the latter, the epidermis which it has loosened; it has also fourteen legs, but it is greenish white, whereas the miner of the apple tree is yellow."

Note.—It is probable that a pear tree miner would not differ from the miner of an apple tree; probably in this case Réaumur alludes to the upper side miner, his yellow larvæ being the under side miner.

"But at the beginning of spring I had the moth from a cater-

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pillar which mines in blotches the leaves of the nut, and which makes a ridge on the epidermis of the mined part. This moth may vie with all others in beauty, its anterior wings are streaked transversely with clouded gold and shining silver; on each wing are six or seven gold stripes, and four or five silvery."

Note.—As the larva of *Lithocolletis Coryli*, Nicelli, mines the upper side of the nut leaf in blotches, and the larvæ of *L. Nicellii*, the underside, and Réaumur does not mention on which side his larva fed, it would have been impossible to identify the species but for his description of the perfect insect, which, though none of the best, sufficiently points to *Nicellii* in preference to *Coryli* to indicate that as the species. In other cases I have omitted to refer to his descriptions of the perfect insects, as in few instances are the species recognizable. The descriptions were probably made, as Zeller has suggested, from specimens which had been allowed to die in boxes, and afterwards injured in pinning.

"Since these mining larvæ are able to spin, as they make cocoons, we need no longer wonder how they can form those kinds of ridges, those folds of the epidermis, which they have loosened, and under which they lodge. We have elsewhere (Vol. II. Mem. V.) seen the proceedings of the larvæ which roll and fold leaves by means of thread, which they place in different directions, and then load with the weight of their body; let us suppose a similar industry in these miners, and this is all that is necessary on their part to cause the loosened membrane to assume these folds. It is true that in these folds, among those which only form a simple ridge on the leaves of the oak, the parts approximate far more closely than when leaves themselves are folded, but then our mining insects have to deal with a membrane incomparably finer and thinner than a leaf. They spin webs on the interior portion of their cavity, and it is these webs which force the membrane to bend. Their webs are so fine and close that I should not have recognized them had I not known that our insects must have made them."

"All the miners which mine in blotches do not, however, form folds in the membrane which covers them. M. Vallisnieri has mentioned a larva which mines galleries in the rose leaves of our gardens."

Note.—The gallery miner of the rose leaves in our gardens is a *Nepticula*, but unfortunately for deciding on the specific name, it happens that two species feed in the rose leaves. However, that which seems the most common is *Nepticula anomalella;* these larvæ, when full grown, emerge from their galleries, and generally form their yellowish-brown cocoons at the base of the footstalk of the

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leaf, a fact first observed, or at least made known at one of our meetings, by Mr. Westwood. Where the cocoons of other species are placed is not yet known.

"We also find on the same roses and on the dog rose blotch miners; indeed, there are no shrubs on which these miners are more common. The membrane of the upper side only makes a little protuberance outwards. We also find on the holly, nut, oak, &c. great places mined and covered by the epidermis, which forms a convexity outside the leaf, without having a sensible ridge.

"This epidermis, in drying, might easily become more stretched, but the shortening of its fibres cannot force it to assume a convex form; it is by spinning one or several very fine webs that the miner has obliged it to separate, and to keep apart from the portion of the leaf from which it has been loosened. These webs are, however, as already mentioned, hardly perceptible but by the effects they produce; but in order to convince myself that the insects do spin them in places where they may be necessary, I pierced with the point of a penknife the thin membrane that was above the mined place of a rose leaf, and made a small rent which allowed me to see the insect exposed. When I wished to examine the same gap twenty-four hours afterwards, I found the edges reunited by a web which the miner had spun on the interior surface of the torn epidermis. I cut in the same way the membranes which covered the blotch miners of the apple, and they behaved in the same manner as the rose miner.

"We may, however, assure ourselves without this experiment that the miners of the apple carpet with web the epidermis they have loosened; if we open their small abode it is best to do so on the thick side, and we see all the edges of the fleshy part, which is joined to the epidermis, are whitish, though at a short distance from these the fleshy part is quite green. The web which is spread over the epidermis goes a little beyond the place where it is joined thereto.

"We only perceive the green of this fleshy part through a white veil spread over it.

"Besides the insects which form a ridge on the portion of the epidermis of the oak leaves which they have loosened, there are caterpillars, as we have just seen, and even of different kinds, which mine the same leaf, and which only cause the epidermis of the mined part to assume a slight convexity. If we observe at certain times the portion of the epidermis which has been raised by some larvæ, it seems to have in its middle a circle more opaque than the rest; this I have observed, more than at any other time, towards the end of July. If we raise this portion of

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the epidermis we shall see that this white circle does not belong to it; that opposite the place where it appeared is a little cocoon of white silk; it is nearly circular, and fastened to the leaf itself. Towards the 15th August small moths made their escape from these little cocoons (*Tischeria complanella*)."

Note.—I have not yet bred this species, and no modern writer has given a detailed account of the mode of living of the larvæ and pupa; Ratzeburg, it is true, described and figured the larva, but he states that the *larvæ winter* in the leaves, and makes no mention of the singular circular cocoon. Mr. Stainton once found such a cocoon in a leaf of *Centaurea nigra* at Mickleham, in August, but the tenant died, and he much doubts whether it was Lepidopterous.

"Early in spring we may observe thousands of oak leaves, of which very large portions of the upper epidermis have been loosened; that of more than half or three quarters of the leaf is raised, and forms very frequently a slight convexity; but these large mined places are also the work of several miners, which, after living in solitude during a portion of their life, have united to labour at the same work. If we look at the part of the leaf which is between the large mined place and the foot stalk, we shall see several narrow and tortuously mined galleries, which are the roads in which the insects have lived and grown, and which they have followed to arrive at a point where they should mine together on a large scale. If we, towards the beginning of June, remove the epidermis of the large mined place, the part of the leaf which we expose to view is very green, and sometimes very smooth; it does not appear that its substance has been eaten, neither do we see any excrements therein, but we immediately observe two, three, or four places, according to the size of the mined portion, which are raised and white. They resemble small portions of, as it were, a second epidermis, which had been loosened, or places which had been mined a second time. These places are those where each little caterpillar has spun a cocoon so thin, and of so close a texture, that it appears only to be an epidermis of the leaf; it has, at any rate, the colour of it; but we can convince ourselves that this covering has been spun; for if we tear it we can distinguish the threads of which it is composed, and see that the texture does not at all resemble the epidermis of a leaf."

Note.—There seems little doubt that *Coriscium substriga* is the insect here alluded to, but, according to Mr. Sircom's observations, the larvæ quit the leaves previous to spinning their white cocoons; whereas Réaumur describes them as spinning their

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cocoons beneath the epidermis of the leaf: as that is contrary to the rule in other species of the *Gracillaria* group, I am inclined to fancy some mistake.

"The cleanliness of a miner which makes blotches on the leaves of the oak does not admit of our confounding it with many others. There is, however, nothing particular in its labour; the space which it mines is nearly circular; the epidermis which covers it has a slight convexity, without having a ridge. When not mining, it is very generally bent as a bow. If we remove the epidermis that covers it, we perceive no excrement in its abode; it has the precaution to make it outside its dwelling. In observing one of these larvæ, I saw it walk backwards, till its anus was close to the edge of its abode; it even made it go beyond, for there was a little slit for it to go through, which the larva knew where to find, and it then ejected a little black grain, and immediately the larva retired into the middle of its dwelling. When I afterwards examined with a lens the places mined by the larvæ of this species, I recognized that they had all a little slit on the upper surface of the leaf. The excrement which they eject at this opening very frequently falls to the ground, being hard grains, which roll on a smooth surface. In vain did I examine this insect with a powerful glass, and in a strong light, I could find no legs even when it tried to walk. Its body is white, but the head and tail are brown; the anus is beneath, and has a wide border; the head is very flat; the jaws, which are the most marked parts of it, form a point where they meet. The exterior form of each is an arc, which seems a portion of a circle."

Note.—This "clean miner," as Réaumur called it, is very probably *Tischeria complanella:* at any rate, a larva which corresponds to Réaumur's account, and also to Ratzeburg's observations of that species, makes blotches on the oak leaves in September and October.

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XVI. *Descriptions of some* Longicorn *Beetles discovered in Northern China, by* Rob. Fortune, Esq. *By* W. Wilson Saunders, Esq., F.L.S., *&c.*

[Read 7th February, 1853.]

When I had the pleasure of laying before the Entomological Society, a short time since, a paper on the new species of *Cetoniadæ*, found in China by R. Fortune, Esq., (*ante*, page 33,) I expressed an intention of giving descriptions of some more of this gentleman's discoveries in the way of Entomology, and in furtherance of this object, I beg leave now to offer the following paper on Longicorn Beetles. It may not be out of place here to observe, that by the mail steamer in December last, Mr. Fortune left this country on his return to China, with the full intention of paying as much attention to the Entomology of the districts he might visit as his more important duties would permit. The result of his continued researches will, there is every reason to expect, greatly enrich our collections, and add many new facts to our Entomological knowledge, for he is now well prepared for collecting insects, and knows the wants of Entomologists, and has had his attention drawn to various points in the natural history of the insects of China which want clearing up, and which require particular observation.

Eurypoda, n. g. (εὐρὺς ποῦς.)

Head broad, subquadrate, flattened above, with a shallow furrow between the eyes. *Mandibles* exserted, incurved at the point, strong. *Palpi* short. *Labrum* fringed with hairs. *Eyes* large, reniform, surrounding the posterior portion of the base of the antennæ. *Antennæ* not quite equalling the length of the body, stout and cylindrical. First joint short, pyriform, slightly curved outwards; second very short, obconic; third long, subcylindrical, longer than the fourth and fifth combined; the remaining joints subequal, shorter than the fifth, gradually tapering; the terminal joint the longest, somewhat curved and pointed. *Thorax* broader than the head; quadrangular, flattened above, broader than long, with the sides smooth, and the posterior angles rounded. *Elytra* rather broader than the thorax, with the sides parallel and rounded at the apex. *Scutellum* sub-triangular, with the apex obtuse. *Legs* stout, the femora and tibiæ broad and flattened. *Tarsi* short.

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This genus is a close ally to *Mallodon*, from which it differs in the respective lengths of the first and third joints of the antennæ, the short, stout and flattened femora and tibiæ, and in the sides of the thorax being free from serratures or roughness.

Eurypoda antennata, mihi. (Pl. IV. fig. 5.)

Head, thorax and antennæ dull brownish black, deeply and broadly punctate, the thorax having on the disk some slightly raised shining elevations. Elytra flat, bright castaneous, deeply punctate, with two well marked longitudinal ridges on the disk, and a third near the apex externally. Under side of the body bright castaneous, finely punctured, shining. Legs brownish black. Tarsi castaneous; the joints fringed with yellow hairs.

Length, 1 $\frac{8}{10}$ inch.

Habitat North of China.

In the collection of the British Museum.

PHILUS, n. g. (φίλος.)

Head vertical, constricted behind the eyes, with the mandibles long and pointed, and the palpi long and exserted. *Eyes* very large and prominent, especially in the males, broadly reniform, surrounding the base of the antennæ. *Antennæ* in the ♂ longer than the body; in the ♀ about half as long as the body; 11-jointed; in the ♂ with the first joint short, robust, second very minute, third and following joints subequal; the terminal joint longest and pointed; in the ♀, the third joint the longest. *Thorax* subcylindrical, in front narrower than the head, with the sides and disk without elevations. *Elytra* much broader than the thorax, with the shoulders prominent, gradually tapering towards the apex, and terminating in an obtuse point. *Legs* and *tarsi* moderate. Whole insect hairy.

This genus should be placed somewhere near *Erioderus*, and not far from *Tragosoma*, which appear to be its nearest allies. From the former, which it most resembles, it differs very essentially in the joints of the antennæ—the third joint in *Erioderus* being very long—and in the general shape of the insect.

Philus inconspicuus, mihi. (Pl. IV. fig. 3, ♂; Pl. IV. fig. 4, ♀.)

Dull castaneous brown, covered with fine erect pubescence. Head and thorax finely punctate. Elytra with longitudinal striæ, and deeply and broadly punctate. The ♀ is larger than the ♂, with the sides of the elytra more parallel.

Length of ♂ $\frac{9}{10}$ inch; of ♀ 1$\frac{1}{10}$ inch.

Habitat North of China.

In the collection of the British Museum.

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CALLICHROMA, Latr.

C. Faldermannii, mihi. (Pl. IV. fig. 7.)

Head inclined, with the neck broad and short, bronzy green, rugose. Palpi prominent. Antennæ black, with the seven terminal joints ferruginous. Thorax subcylindrical, broader than long, with a raised anterior and posterior margin, spined at the sides, and with five rounded tubercles on the disk; purplish green, with the disk and sides castaneous, shining. Scutellum triangular, purplish green, shining. Elytra broader than the thorax, with the shoulders prominent, gradually tapering to an obtusely rounded apex, finely and rugosely punctate, with two longitudinal ridges, more apparent at the base; bronzy green, with the centre of the disk browner; legs purplish black, shining, with the femora clavate, and the fore tibiæ fringed with yellow hairs internally. Tarsi castaneous.

Length 1½ inch.

Habitat North of China.

In the collection of the British Museum.

This species has some resemblance to the beautiful *C. Cantori* of Hope, but differs in many respects, particularly in the colour of the thorax and antennæ. It also nearly approaches the *C. Bungii*, Fald., particularly the variety called *cyanicornis* of Dupt.

COLOBUS, Serv.

C. sericeus, mihi. (Pl. IV. fig. 2.)

The whole surface of the insect is covered with fine silky pubescence. Head vertical, with a very short neck; dark chesnut brown, with the eyes and five or six terminal joints of the antennæ black. Antennæ nearly as long as the body; palpi exserted; thorax rather broader than the head, orbicular, truncate before and behind, with a slight protuberance on each side, and four slight rounded elevations on the disk; above dark chesnut brown, margined anteriorly with black; below black. Scutellum small, triangular, black brown. Elytra broader than the thorax, not half the length of the body, ovate, pointed posteriorly, and with the suture gaping, and shoulders prominent; dark chesnut brown. Wings bright chesnut brown, voluminous, exserted considerably longer than the body. Abdomen and underside of body purplish black brown, with the pubescence on the basal joint of the former silvery on the underside. Legs long,—particularly the hinder pair, which have the femora and tibiæ flattened,—bright chesnut brown, with the tarsi a little darker.

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Length 1 inch.
Habitat North of China.
In the collection of the British Museum.

A remarkable insect, nearly allied to an undescribed species from Silhet, which is in my collection, and which differs from it chiefly in the colouring of the underside of the abdomen.

Cerosterna, Dj.

C. hispida, mihi. (Pl. IV. fig. 6.)

The whole surface of the insect is covered with pubescence, interspersed with long, erect, rather distant bristles; colour dark purplish brown, mottled with black, with small white specks pretty generally and equally distributed among the black mottles. Head vertical, with a broad cylindrical neck. Eyes very narrow and elongate, black. Joints of antennæ free from tufts of hair. Thorax a little broader than the head in front; subcylindrical, armed on each side with an acutely pointed spine, and having on the disk an elevated mass of rounded tubercles. Scutellum small, trigonate. Elytra much broader than the thorax, with the shoulders very prominent; the sides nearly parallel; apex rounded. Legs long and stout. The intermediate tibiæ toothed externally near the apex; fore tibiæ slightly curved, and all fringed with short black hairs at the apex, on the front and posterior margins.

Length 1 to 1 $\frac{9}{10}$ inch.
Habitat Northern China.
In the collection of the British Museum and other cabinets.

This species comes close to the *C. histrix*, but differs in wanting tufts of hair on the antennæ, which are much darker in colour, and in being hispid, not spiny.

Glenea, Newman.

Fortunei, mihi. (Pl. IV. fig. 1.)

Head vertical, immersed up to the eyes in the thorax. Face yellow, with a central obsolete blackish heart-shaped mark, hairy; forehead black. Antennæ black, with the apex of the third joint greenish yellow above. Thorax a little broader than the head, quite cylindrical, rather broader than long; slightly carinated longitudinally above; greenish yellow, with two round black spots on the disk, one on each side of the raised line, covered with distant fine erect black hairs. Scutellum trigonate, rounded behind, greenish yellow. Elytra much broader than the thorax, tapering to a rounded apex, with the shoulders prominent; black, with a

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broad central greenish-yellow wavy band, and having a greenish-yellow spot on the apex and shoulder of each elytron partly covered with fine erect distinct black hairs. Under side of body greenish yellow, pubescent. Legs black, with greenish yellow undersides to femora and tibiæ. Tarsi greenish yellow above.

Length $\frac{5}{10}$ to $\frac{6}{10}$ inch.
Habitat North of China.
In the collection of the British Museum.

This pretty species varies considerably in the nature of its markings, being sometimes without the yellow green spots near the shoulder, and sometimes with the spots produced into a narrow transverse wavy band.

XVII. *Notes on the Habits of Various Insects.* *By* Mr. William Varney.

[Read 2nd August, 1852.]

Sting of Bee.—Hüber says, that "the sting by which this little animal defends itself is composed of three parts, the sheath and two darts. The sheath, which has a sharp point, makes the first impression. The sheath sometimes sticks so fast to the wound, that the insect is obliged to leave it behind; and to the bee itself the mutilation proves fatal." The sheath, however, makes no impression, and I have never found it to enter or make a wound; it is large near the base, and gradually tapers to a point, and is quite smooth, and if it did make an incision the bee would be able to draw it back again without hurting itself. The barbs which do the mischief are very sharp; and when they penetrate, they hold fast to the wound like a fish-hook, and the bee is mostly unable to draw them out of the wound, always leaving the darts with the sheath; and it seems impossible to leave the sheath behind without the darts, as they are all rooted firmly together. I know not whether, when thus mutilated, they die, or whether they are killed or driven away by the other bees.

Moss-carder Humble Bees.—Respecting the humble bee, Réaumur says, that "the community, which numbers from 20 to 300, consists of females of two sizes—the very largest and the small ones; males, which are stingless; and neuters. It is

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very probable that, alone and unattended, the female lays the foundation of the future little village. The nest is composed of a tuft of moss." On a sloping bank, near Hanwell Asylum, among the shrubs, I found one of these curious little nests; it consisted of a small lump of moss, one large bee, one cup filled with honey, and six small larvæ of the bee feeding upon a mass of pollen, of a darkish brown colour. I found another nest on the same bank, about ten yards distant, which was a little larger than the first—as large as a hen's egg; it consisted of a lump of moss, one large bee, one cup filled with honey, and six larvæ feeding upon a mass of bee bread; and six cocoons, spun by the full-grown grubs of the bee. Each nest was founded by a large bee, the largest of the class. I think the small ones are not females, but workers only.

Wasp-nests.—Réaumur says that "the material from which the common wasp's nest is constructed is vegetable fibre. As the first step in the process of paper-making is to soak the vegetable fibre in water, so the wasp takes as special care to select the filaments which it intends to use from wet wood, which has rotted in the rain." In the summer of 1850, I saw a great many common wasps gathering wood from a post which was quite dry; each load which the wasp carried away was quite wet. This lasted many days; and as I stood near, and paid attention, I could see how they acted. The wasp ran about the post a little, and as soon as it found a place suitable, it wetted the wood, then scraped a little bit together, and put it between its fore legs, then it scraped another bit and put it to the first, and so it went on, until it had got a load; it then worked it all together into a ball, took it between its mandibles, and flew away to its nest. I could see the wet upon the wood when the wasp had gone away. The wasp scrapes the wood very fine, which would all fly away in dry weather, if no fluid was used. The wasp, by wetting the wood, can gather a load with little trouble, and with no loss of labour.

Mason Wasps.—On the south side of a brick wall, at Hanwell, I found a mason wasp at work, building a cell with mortar, which it finished in about an hour. It went seven times to some water, which was about twenty yards from the wall; with each supply of water it made two loads of mortar, very near the wall; when the cell was finished, the wasp laid an egg, and filled the cell with living food. I then opened the cell, which contained eighteen larvæ; they were not all of the same size, but each one had sixteen legs. I put them back into the cell, and closed them up. Another time, I broke down part of a cell when it was finished,

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but the wasp mended it again in a short time. Another time, I took away six caterpillars, and put them a short distance from the cell; the wasp found them, and put them back into the cell. Again, I took away the egg of the wasp, and when the cell was finished I opened it, and found another egg in place of the one which I had taken away. When the wasp brought a caterpillar to its cell, it held it in a straight line, under its belly, carrying one end between its jaws. The caterpillars appeared dead, and were packed very close in the cell. The wasp slept in the cell at night, with its head out, and when the cell was nearly full, it remained with more than half its body out. I touched it several times, but it would not quit the cell. I then put an ant to it, which it crushed with its jaws. It made six cells in a week, and made mortar in one place the whole time, and continued to get water in another place; when it was making mortar the ants disturbed it several times, which made it fly up sometimes; at other times it would move a little, but it refused to leave the spot. I have never found these wasps to make a hole in a solid brick or stone, but when they find a cavity with loose rubbish in it, they will clean it out. These wasps are much smaller than the common social wasps, and are known by having a large black ring round the middle of the abdomen. They build cells in the cavities of walls.

Wasps killing Flies.—The common wasps catch a great number of flies in the summer time; and when they find a spot well stocked with these insects they will go there a great many times, until it is exhausted. When a wasp catches a fly, it first cuts off its legs and wings; then bruises it into a mortar, and carries it away to the nest. Having caught a fly, I put a bit of string round the middle of it, and offered it to a wasp, which took hold of it, and cut off its wings and legs, as usual; then it took hold of it to carry it away, but finding it could not move it away, it pulled first one way, then the other; at last, it found out the string, which was very fine, and cut it off close to the fly, which it then carried away.

Honey Bees.—I have observed that the honey bees gather honey from some flowers whilst they never touch others. They are very fond of the mignionette, but I have never seen the humble bees touch it. I have seen a great number of wild bees upon the snapdragon, the fox-glove, the everlasting peas, and the nasturtium, which the hive bees never touch. Both the hive bees and the wild bees are very partial to the Canterbury bells, from the cups of which they gather a great deal of pollen and honey.

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The scent of the blossoms of the Scabious is very much like honey; and upon this flower I have seen a great number of insects. At one time I saw a mason bee, several humble bees, various kinds of butterflies, some other flies, and several hive bees, upon the flowers of this plant.

Bees fond of Water.—Réaumur, Hüber, and many other naturalists, have paid great attention to, and tried many experiments with the hive bees, but I do not find them to say any thing about water. I find these little creatures make use of a great deal of this fluid. In the summer time, in very dry weather, they may be seen drinking water between stones, and round about water-taps, and such like shallow places, immediately returning to the hive. They thus continued to get water every day in dry weather. I think they use it to moisten and prepare the wax: or perhaps they drink some of it, which remains to be ascertained.

Leaf-cutter Bees.—In the fine warm weather, having observed a rose-leaf-cutting bee cut a piece of leaf from the rose-tree, and carry it away and settle upon a wall, and go into a cavity where it was building its nest, repeatedly performing the same operation, I watched it more carefully, and observed that when it settled, it would examine two or three leaves before it found one to suit its purpose; it then settled upon a leaf, with its head towards the leaf stalk, and cut a piece out, which it did in a very short time. It held on to that part of the leaf which it was cutting out, and when it had cut it out it fell down, like a stone, for a short distance, before it took wing. When it had cut out the leaf it was not prepared for flight, and it always fell down like a stone before it took wing. One time, it fell on the ground with its load. It fell down several times among the leaves of the tree, and it found some difficulty in getting out with its load, which it held in a kind of half circle under its belly. I made a tube of bark, and put it in the wall; it was about six inches long, and about one-third of an inch in diameter. This was found in a few days by a rose-leaf cutting bee, in which it constructed a nest of rose-leaves. I split the tube before I put it in the wall, so that it could be opened without damaging the cells. When it was finished, I took it out of the wall, and found it contained eight cells, which were fitted together like thimbles. The tube was not full, it would have held several more cells; but the entrance was blocked up with several pieces of leaf, which prevented any other insect from entering the nest. In cutting a leaf, it sometimes makes a mistake, and when it has cut it about half through, it will suddenly leave it and go to another, but this does not often occur.

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Transformation of Caterpillars.—I have seen many of the caterpillars of the common butterfly in the act of fixing the threads over their backs, the average number being about twenty-six; some pass as many as thirty over their backs, and some only twenty-four. Every time it carries a thread over its back it glues it to the others which have been passed over its back before, which are all glued together into one thread; it then withdraws its head, assumes a straight line, and waits to cast its skin and become a pupa. Some of them cast their skins at the end of three days, some at the end of six days, and some not till the end of the tenth day, when they become pupæ, from which the butterfly makes its escape in the following spring.

Winter Midge.—Contrary to the assertion of a writer, I find a remarkable difference between the male and the female of the winter midge; the male has a slender body and fine feather-like antennæ; the female has a short body, and such small antennæ, that it is difficult to perceive them with the naked eye. The swarms of these beautiful little creatures which are seen sporting in the air in such multitudes, in the winter evenings in mild weather in sheltered situations, are composed of males and females. As they sport together in the air they choose partners; and while they struggle together they fall to the ground, where they become united, and remain together about ten minutes, when they separate, and fly away. There is another winter midge, found about the same time, in similar situations, which sports in the air in the same manner, and in large clusters; the male and female fall down upon the ground, and remain together about the same time as the above. I have found the pupæ of these flies among very rotten rabbit manure. I kept a few of them in a box, which in a few days produced flies exactly like, in shape, size, and colour, to those which I caught sporting in the air. These flies are a great deal larger than the ones above-mentioned; in fact, they are a little larger than the common gnat, but destitute of that long tube in front of its head, which denotes the bloodthirsty gnat.

Caterpillars of Bryophila perla.—On old walls, which are exposed to the weather, I have found a great many caterpillars, which feed upon the fine particles of a silver colour which grow upon such places. They make their cocoons in the holes of the wall, weaving a web over the hole; then they bite off bits of stone, brick, mortar, or moss, and fix it to the webbing, so that it is difficult to find them out in some places, as the cocoon so nearly resembles the wall, brick, or mortar, to which it joins. They are found in the winter months, and when the weather is mild they

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bite a hole through their cocoons, and come out and feed; then they return back to their cells, and put out their excrement; then they close up the hole, which makes it complete. They do not travel more than four or five inches, or at most a foot, from the cell, as they find food close at hand. They generally return to the cell which they had occupied before; but when several of them are feeding near together, they sometimes go into the wrong ones; and some of them cannot find their own cells, and are obliged to wander about till they can find a place to build a new one. They feed in the morning, and return to their cells about nine or ten o'clock, which I have witnessed many times. This morning, Thursday, 5th February, 1852, I saw a great many of them feeding upon a brick wall; and I saw three of them go back to their own cells and eject their excrement; then they closed up the entrance as neat as though it had never been opened. In cold weather they remain in their cocoons three or four days; and in very sharp weather, as many as nine or ten days, or even more, without food; but as soon as the weather becomes mild, they feel the change, and break through the cell, and feed as fresh as ever. I put one in the wall, in a small cavity, and put a piece of glass over it to see how it would begin its cell; and I saw it carry several threads over the hole. It then bit off several bits of moss, and pushed them between the threads, until it became quite thick, and I could not see it any longer, as the caterpillar was inside the cell. The cells are quite smooth inside. These larvæ are about half or three-quarters of an inch long when they are full-grown, and are marked with blue and yellow stripes across the body. They change to a pupa, from which the fly makes its escape in about three weeks, in May. The eggs of these flies are a long while before they produce caterpillars, as the latter do not appear before the latter end of November, or the beginning of December, when the weather is damp and cold; and although they are very small, they seek for a small cavity, in which they construct themselves a nest. They are provided each with sixteen legs; some are of deeper blue than others, and most of them are marked with blue on each side, a yellow line along the back, and a few small brown spots.

Blow Flies.—Speaking of the species of blow-flies which produce lively larvæ instead of eggs, Réaumur observed, that "there is no danger of the maggots being destroyed in the midst of the putrifying mass, which might have been the case had eggs been placed there." When these flies find a piece of meat, or a dead carcase, they search about and find an opening, in which they

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deposit their eggs, and always put them as near to the centre as they can; and as soon as the maggots are developed, they eat their way to the interior, where they find the most food. There is no fear of the eggs being killed in the middle of the dead carcase. The flies put their eggs as far as they can into the meat or carcase, where they find moisture, which hastens their development. The eggs are not to be seen on the exterior part of a dead carcase, or on the outer part of a piece of meat of any kind; but the flies take care to put them in the hollow and moist places, where they soon hatch; and if you open the mouths of any dead animals, you may find the eggs in large quantities. When they deposit their eggs on a living sheep, they are close on the skin, where it is moist.

XVIII. *Contributions towards the Natural History of British* Microlepidoptera. *By* J. W. Douglas, Esq.— (*Continued from page* 81.)

[Read 6th December, 1852.]

Genus Lithocolletis, Zeller. (Pl. XIII.)

The perfect insects of this genus may be known at a glance by the slenderness of their structure, the smallness of the thorax, and the characteristic markings of the anterior wings. These latter are fine lines on the apical half of the wing, sloping from either margin towards the apex, frequently meeting on the disk, and forming angles more or less acute. The general similarity of many species has caused great difficulty in recognising their distinctive characters; but though by practice they become more easy to separate, yet the most satisfactory mode of determining them is to rear them from the caterpillar state. Zeller has observed (Linnæa Entomologica, i. 169), that on account of the cilia of the anterior wings being coloured and scaled like the wings themselves, the true form of the latter is only to be seen on the under side.

The larvæ have but fourteen feet, the fourth ventral pair being absent; the whole body is flattened, the head small, and the three thoracic segments generally much widened; this last fact being the more remarkable when contrasted with the narrow

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thorax of the perfect insect. These larvæ mine in the leaves of many plants; some species on the upper and some on the underside; each kind, however, keeping invariably to one side, and having its own characteristic method of working, and each individual passing its whole life in one leaf. When first the larva begins to feed on the parenchyma, it loosens the cuticle, which on this spot then appears as a whitish film: it soon, however, contracts into folds, the colour becomes darker, and as the hollowing process proceeds beneath it, the leaf contracts, and curves, more or less, forming a spacious tenement for the miner, whose age may be known by the appearance of its dwelling. The means by which it accomplishes its purpose have been described by Reaumur (*vide ante*, p. 102.) Of many, perhaps of all species, there are two broods in a year.

When about to change to a pupa, the body of the larva becomes contracted, and of a clearer colour, having been cleansed of all remains of food. The change always takes place within the mined place; in some cases, within a silken cocoon, made by the larva; in others, the pupa is loose. When the imago escapes, the pupa-skin is left projecting through the skin of the leaf.

The characters of the genus are laid down by Zeller, in the "Linnæa Entomologica," (Band. I., 167, 1846); and descriptions are given of all the then known species. In Curtis's "British Entomology," all the British species are placed in the genus *Argyromiges*, but unfortunately the author has drawn its characters from *autumnella* (*T. Clerckella*, L.), which differs from the species with which it is there associated, in the form and neuration of its wings, in the enlarged basal joint of the antennæ, in the larva having sixteen feet, and in its habit of quitting the leaf it has mined, previous to forming its suspended cocoon, so that it cannot stand as the representative of a genus whose larvæ have but fourteen feet, and change to the pupa state within the substance of leaves.

Lithocolletis trifasciella, Haworth, Stainton. (Zool. 2088.)

Larva (Pl. XIII. fig. 1 *a*).—Length 2½ lines.—Citron yellow, shining, transparent, hairy, with a green dorsal stripe. Head of a more dull yellow, mouth brown. Six pectoral, six ventral, and two anal legs yellowish. The upper surface of the segment bearing the last pair of ventral legs is orange.

Mines the underside of the leaves of honeysuckle (*Lonicera periclymenum*), the skin of which it wrinkles and detaches, forming a small pouch, in which it lives and feeds on the

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parenchyma. Soon the leaf begins to curve, and eventually it becomes so much twisted, that the apex approaches the base, and again turns upwards. (Pl. XIII. fig. 1 *b*.)

Pupa brown, with several curved light brown hairs, and a short anal spine. Formed loose in the mined place.

Imago (Pl. XIII. fig. 1).—The first brood of caterpillars occurs in March and April, producing moths in May; the second appears in June, perfecting themselves in July; and a third is found in September and October, transforming to the perfect state in October and November.

This species is not rare in woods and hedges near London; but Mr. Stainton tells me, that in the hedges of Devonshire it is not uncommon to find every leaf on a young shoot of honeysuckle, four or five feet in length, tenanted by a larva.

Lithocolletis Scabiosella. Douglas, n. sp. (Pl. XIII. fig. 2.)

Alis anticis saturatè croceis, *nitidis*, lineola basali alba, strigis tribus introrsus nigro-marginatis, strigulaque apicali argenteis, macula obliqua pone strigam tertiam, apiceque nigris. Exp. alar. 3½—4 lin.

Head and thorax concolorous with the anterior wings, face whitish, antennæ black, narrowly annulated with whitish. Anterior wings rich deep saffron, *very glossy*, with a fine, very short white basal streak: three equidistant bright silvery strigæ, margined interiorly with black; the first nearly straight; the second angulated in the upper half; the third composed of two long opposite spots, broad on the margins of the wing, and meeting with pointed apices on the disk, but curving outwards, and forming an angle; two other white spots form a short apical striga, the apex itself and a long oblique spot, stretching from the third striga to the anal angle, being black. Cilia concolorous with the wings. All the tarsi broadly annulated black and white.

Most nearly allied to *L. trifasciella*, the white markings of the anterior wings being almost identical in form; but the dark margins of the three strigæ are much narrower, and of a more uniform width; the ground colour of the wings is much darker, the whole surface is more glossy; the strigæ especially being conspicuous by their bright silvery hue, and the average size is a trifle less than in that species.

Larva (Pl. XIII. fig. 2 *a*).—Length 2½ lines.—Light yellow, with short hairs of the same colour, and a dark dorsal line. Head small, of a light testaceous colour; thoracic segments

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widened, the others gradually tapering to the extremity of the body. Six pectoral, six ventral, and two anal legs the colour of the body.

Feeds in the radical leaves of *Scabiosa Columbaria* (Pl. XIII. fig. 2 *b*), mining on the underside, detaching the epidermis, which becomes wrinkled in longitudinal folds; the upper surface becomes convex in consequence, but preserves its colour.

Pupa light brown, with a few very fine hairs, and a stout anal spine.

There are two broods in a year. I first found the larvæ, very small, on the 9th of April, 1852, at the side of the old tram-way beyond Croydon, and they were perfected at the end of May. The second brood of caterpillars appeared in July, and the moths in August.

This is the only species of this genus whose larvæ are known to feed upon a herbaceous plant, all the others being found on the leaves of trees and shrubs.

Lithocolletis Emberizæpennella, Bouché, Zeller. (Lin. Ent. i. 241.)

Larva (Pl. XIII. fig. 3 *a*).—Length 3 lines.—Greenish white, widest in the centre, tapering a little to each end; thus differing from all other known larvæ of this genus, inasmuch as in them the thoracic segments are widest. Herr v. Nicelli has noticed this peculiarity in his paper on *Lithocolletis*, in the "Entomologische Zeitung," for 1851 (translated by Mr. Stainton, Zoologist, App. clxiii). Head pale greenish, margins and mouth brown. Six pectoral, six ventral, and two anal legs, the colour of the body. Mines the underside of the leaves of honeysuckle (*Lonicera periclymenum*), making a *large cavity* (Pl. XIII. fig. 3 *c*), in consequence of which a large fold downward of the leaf occurs, and the cuticle appears white on the upper side, but the leaf does not twist round at right angles, as in the case of *L. trifasciella*. Found in July and September.

Pupa (Pl. XIII. fig. 3 *b*).—Light brown, robust; obtuse at the head and tapering to the other end, on which is no spine, but a scarcely visible blunt prolongation. There are a few hairs along the whole extent, and projecting from under the head towards the side, apparently from the margin of the next segment, are two stout hairs, or spines, curving outwards. The covers of the antennæ are longer than the wing cases, but the pair of hind legs along which they are laid are still a little longer, and all are joined together in one piece, which at the apex is free from the body.

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(The figure was made from a specimen from which the moth was about to emerge, and the markings on the wings are seen through their cases.) The pupa is formed within the mined place, in a dark greenish brown, bluntly pointed, oval cocoon, of silk (Pl. XIII. fig. 3 *d*), which is either loose or slightly attached to the leaf.

Imago (Pl. XIII. fig. 3).—Found in May and August.

Genus Gracillaria, Haworth. (Pl. XIV.)

The most striking characteristics of this genus are the general slenderness, the length of the antennæ, the length and narrowness of the anterior wings, the development of the maxillary as well as the labial palpi, and the position of the moths in repose—sitting with the fore legs advanced, the head elevated, the antennæ laid back under the wings, and the apices of the anterior wings touching the surface on which they sit. Haworth has briefly characterised the genus (Lep. Brit. 527, 1828); Zeller more fully (Lin. Ent. ii. 313); and also Stainton (Trans. Ent. Soc. i. N. S. 115). Mr. Curtis has given the characters, founded on dissections of *G. Syringella*, of which he has also figured the preparatory states (Brit. Ent. Pl. 479).

The larvæ feed on the leaves of various plants, probably all the species in the first instance, as miners; then each rolls a leaf into the form of a cone, at least the greater number of species do so, and feed within it. Some species are always miners. These larvæ have but six ventral legs.

The pupa is enveloped in a cocoon.

Gracillaria Franckella,, Hübner, Zeller, Stainton. (Trans. Ent. Soc. i. N. S. 118.)

Larva (Pl. XIV. fig. 1 *a*).—Length 3 lines.—Greenish white, semi-transparent, slightly hairy, the dark green of the dorsal vessel showing conspicuously through. Head yellowish, the mouth and two spots on the inferior side brown. The six pectoral, six ventral, and two anal legs the colour of the body. Curls up the end of one of the lobes of leaves of the oak (Pl. XIV. fig. 1 *b*), in which it feeds, discolouring its habitation, and removing to other leaves several times in succession. Found in August, September, and October.

Pupa, in a cocoon attached to a leaf.

Imago (Pl. XIV. fig. 1).—Found in September and October, and hybernated specimens from April to June.

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Gracillaria stigmatella, Fabricius, Zeller, Stainton. (Trans. Ent. Soc. i. N. S. 120.)

Larva (Pl. XIV. fig. 2 *a*).—Length 3½ lines.—Greenish white, head yellowish, with two brown spots at the side; jaws brown; short white hairs on the whole length. The six pectoral, six ventral, and two anal legs are of the same colour as the body. Feeds on the leaves of sallows, poplars, and willows, rolling and fastening up the ends into the form of a cone (Pl. XIV. fig. 2 *b*), within which it lives, consuming the portion rolled up; taking care, however, not to destroy the outer epidermis. This soon becomes discoloured, and when the supply of food is exhausted, the larva removes, and makes another similar habitation, and so on several times in succession. Found in August, September, and October.

Pupa, in a cocoon attached to a leaf (Pl. XIV. fig. 2 *c*).

Imago (Pl. XIV. fig. 2).—Found in September and October, and hybernated specimens in March and April.

Gracillaria auroguttella, Stephens, Stainton. (Trans. Ent. Soc. i. N. S. 187.)

Larva (Pl. XIV. fig. 3 *a*).—Length 2½ lines.—Pale whitish green, slightly shining, with short hairs on its whole length. The dorsal vessel shining through, of a dark green colour. The six pectoral, six ventral and two anal legs are of the colour of the body. Head pale brown.

It first mines the leaves of *Hypericum perforatum* and *H. humifusum* in the centre, and as the gallery increases in length and width (though it never becomes very wide), the under side of the leaf is contracted, and the edges turn down. After living as a miner until the gallery is one-third or half an inch in length, it quits it and turns down the end of a leaf in a conical shape (Pl. XIV. fig. 3 *b*), and feeding within, the cone at first green, soon becomes whitish, and then brown, and it removes and forms several of these habitations in succession, each larger than the previous one. When full fed, it rolls a leaf no longer across and conically, but lengthwise, and as a tube; and this (soon becoming brown) resembles a miniature cigar (Pl. XIV. fig. 3 *c*). In this, after spinning a closely fitting silken web, it becomes a pupa (Pl. XIV. fig. 3 *d*). There are two broods in a year; the first in the beginning of July, producing perfect insects in August; the other in October, remaining all winter in the pupa state, and transforming in May.

Imago (Pl. XIV. fig. 3).

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XIX. *Notices of some New Species of Strepsipterous Insects from Albania, with further Observations on the Habits, Transformations, and Sexual Economy of these Parasites.* *By* S. S. Saunders, Esq.

[Read 6th December, 1852.]

Having met with several new Strepsipterous parasites, obtained from different species of *Hylæus* and *Odynerus*, and having had frequent opportunities of witnessing their metamorphoses at different periods, whereby many of the questions which had arisen as to the mode of effecting ingress and egress, the relative position of the dorsal and ventral surfaces on emerging, the expansion of the vaginal orifice in hexapod-bearing females, and other debateable points, (alluded to in my former communication published in the Transactions of the Entomological Society, vol. i. N.S. p. 43,) may receive further elucidation, I now proceed to lay before the Society the result of my observations, as classed under the following heads.

1. *Saltatorial Powers of the Hexapod Larvæ.*

These hexapod larvæ, when their segments are distended, are of a semi-transparent piceous hue, with minute black eyes, the thoracic region being somewhat inflated, and the segments thence gradually tapering towards the anal extremity; each distinguished, where superposed, by a fine transverse line of deeper brown, the three anterior segments having the posterior margin more broadly banded, the anal apex inclining to castaneous, with the base of the setæ piceous.

Those of *Xenos Rossii* are enabled to leap to the distance of full half an inch, but by what means this movement was effected I could not determine. They did not appear to double themselves round for this purpose, as in the case of the cheese-maggot (*Tyrophaga casei*, Curt.); nor did I observe that the effect was produced, as may be conceived, by the action of the tail and caudal setæ, as practised by the *Podurellæ*, Latr. They also repeatedly lept upon the brush wherewith I had been inciting them to the performance of this feat, after having removed it, as I thought, above their reach. I afterwards observed the same process repeated in the hexapod progeny of the Strepsipterous parasite obtained from a species of *Ancistrocerus*.

2. *Mode of Attack by the Hexapod Larvæ.*

Having captured about the middle of July a large female

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Polistes, with three prolific female parasites protruding from the dorsal segments of the abdomen, I selected from a *Polistes* nest a variety of its inmates, in different stages of development; namely, first, a well-conditioned ovum, with the yelk concentrated, the head and eyes partially discernible, but the embryo exhibiting as yet no signs of activity;—secondly, one in a more advanced state, the larva within ready to burst the superincumbent pellicle, and making vigorous efforts to do so,—but on placing some of the hexapods upon these, they invariably effected their escape.

I next chose two larvæ of moderate dimensions, carefully extracted, whereunto the hexapods very readily attached themselves in a singular manner, affixing both head and tail like leeches.

I had already noticed a similar proceeding on the part of certain hexapod larvæ of *Hylecthrus*, which, in the absence of any larvæ of *Hylæus*, I had placed upon some other larvæ of diminutive size, obtained from a *Polistes* nest, to which the former readily attached themselves in the manner aforesaid; sometimes commencing with a wriggling motion, and shortly afterwards remaining perfectly still, assuming by degrees a gibbous distended form. Fearing at first, from their apparently inanimate condition, that they might have been injured in some manner, I supplied several in succession, with the like results; when, disturbing one of the earliest so placed, I found it still alive, the body being moved about from side to side without withdrawing the head. The following morning, finding the hexapods still motionless, I again disturbed one of them, when it commenced coiling about with the same activity as before, retaining the head immovable, and apparently endeavouring to effect a breach; or perhaps already imbibing nourishment, as practised by the larvæ of certain *Diptera*, in which the resemblance to the leech is also carried out.

The *Polistes* larvæ, together with the hexapods, perished within two or three days, without any further operations on the part of the latter; but the subsequent experiment with the *Xenos* hexapods proved more conclusive.

At 2 p. m., one of these hexapods had affixed itself upon the back of the first of the two *Polistes* larvæ aforesaid (which by way of distinction may be designated as A. and B.), and at 5 p. m., had completely buried itself beneath the skin, in a transverse position; while another, which had stationed itself upon the catenulated lateral margin of the segments, remained at the same period *in statu quo*. By the morning, however, the latter had

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shifted its quarters, and was observed nearly buried beneath the skin, at no great distance from its companion, and later in the day both were completely out of sight.

The other larva, B., which had two hexapods placed upon it at 3 p.m., one of which had taken up its position on the breast, was found at 5 p. m., having this half-buried beneath the skin, the remaining portion recumbent, and attached outside. The second hexapod had fixed itself upon a lobe of the head, near the mentum, from which I was unable to detach it; but it subsequently removed, and in the morning was nowhere to be found, while the first had entirely and deeply penetrated within.

Other hexapods, placed upon a soft yellow *Polistes* pupa, left this unmolested.

3. First Moult.

About a week later, viz., on the 24th, seeing little prospect of rearing the said *Polistes* larvæ, to which I had administered in the interval moistened sugar, diluted honey, fruit, &c., with no appearance of relish on their part, I determined to institute a search for the hexapods within, in order to ascertain what their condition might be. On carefully opening B, and removing a dark globular mass, which is always met with in those larvæ, I found the hexapod which had penetrated on the 17th and 18th, in a somewhat distended condition, perfectly motionless, the head deflexed, the anterior segments humped, and obviously preparing to undergo its first moult, as seen in the silkworm.

In about half an hour, I observed that the juices of the *Polistes* larva were rapidly inspissating, while the hexapod itself appeared to have undergone some alteration; and on further examination, I perceived that the latter was then in the act of discarding its hexapod skin, the anterior portion being now pellucid white, without any trace of legs, furnished with two minute but very distinctly marked black eyes, and having the lower region still enveloped in the fuscous folds of the hexapod.

During the day, I also opened the other *Polistes* larva, A, and soon found the two hexapods which had penetrated on the 18th,—one having its head turned towards the anal extremity, the other lying transversely; neither, however, having undergone any metamorphosis.

4. Position in the Feeding State.

It would seem, from the foregoing remarks, that the position of the Strepsipterous larvæ in the incipient stage exhibits no uniformity, and that the hexapods indiscriminately attack any part of their victims, although eventually restricted to the abdo-

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minal region, preparatory to their ultimate exit. The relative direction of the head appears to vary up to a late period, even when the *Hylæus* or other victim has assumed the pupa state. Among the specimens presented will be found a *Hylæus* nymph, wherein, on removing the terminal segments to the fourth, exclusive, I perceived the anal extremity of a Strepsipterous larva projecting. On separating the fourth segment, the head of the parasite was found directed towards the thorax, in which position it is still retained within the disrupted segment. After this, the third segment was in like manner removed, when three more larvæ of smaller dimensions were observed; one of which was lying transversely, the other two with their heads directed towards the anal extremity, and apparently in the act of forcing a passage between the adipose tissue and outer tegument of the bee, which operation had been commenced higher up. The whole were, however, of much smaller size than might have been expected at this period of their growth; but whether in consequence of there being four to be sustained by one bee, or from some other cause, must be left to conjecture.

5. Mode of effecting Exit.

The nymphs of those *Hylæi* which are likely to produce the pale-coloured specimens (*H. versicolor*), which prove, as anticipated, to be only a variety of the *H. rubicola* consequent upon parasitic absorption, may usually be identified within one or two days of their final metamorphosis, by assuming a yellow tinge, and may be set apart as certain to produce male parasites. I have not unfrequently been enabled to detect the eye-shades of the latter before the *Hylæus* nymph has discarded its pellicle, working to and fro beneath the dorsal tegument; although more conspicuous when the bee first attains the imago form, the head of the parasite being then seen turning from side to side, and steadily pressing all the while upon the rostrum, as the axis about which it revolves, in the ratio of one-eighth of a circle, for the purpose of introducing this between the abdominal folds. Thus when one eye-shade advances the other recedes, both being sometimes carried deeper below, when the greater strain appears to operate upon the upheld rostrum. As soon as a lodgment is effected, this is gradually pushed forward by a continuation of the same process, until sufficiently advanced, the entire operation occupying from one hour in some cases, to two hours in others, and immediately following the ultimate transformation of the bee in its then moist state; after which the parasite remains perfectly motionless.

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I have sometimes seen three parasites thus engaged simultaneously within the same *Hylæus;* and should the attempt not prove successful, the locality is changed for the segmental division next in succession; or, if foiled again here, the parasite sometimes remounts to the preceding one. These efforts have been continued for upwards of an hour after a newly developed imago *Hylæus*, within which the eye shades were discerned, had been immersed in spirits, until at length the parasite appeared to have attained the extreme verge of the segmental threshold ere its career was finally arrested.

The same absorbent influences upon the *Hylæus* not being produced in the case of female parasites, nor any indication of their presence being supplied, as might be expected, by a distension of the abdominal region, no opportunity has been afforded, as in the case of the males, of observing their proceedings at the period of exit.

6. *Occasional Exit from ventral Surface.*

Instances have occurred when male parasites have effected their exit between the *ventral* segments of the *Hylæi*. A similar occurrence in the *Xenos* has been alluded to by Jurine, who states that he found their "tumeurs placées ordinairement entre les 3°, 4° et 5° segmens abdominaux, plus frequemment en dessus qu'en dessous."

This anomaly having been witnessed in the *Hylæi* in those cases only where several parasites had been nurtured by the same individual, may be ascribable to impediments derived from want of space, although in some instances three fully developed pupa-cases have been protruded between the dorsal folds, and the imago duly produced from each.

Whenever any of the parasites have presented themselves on the ventral surface of the abdomen of the bee, the pupa-cases have been reversed, their relative position as regards the body of the bee being the same as usual, the rostrum pointing towards the abdominal segments.

7. *Subsequent Metamorphoses.*

a. Of the Male.

The head of the male *Hylecthrus* at the moment of protrusion is white, the eye-shades of a castaneous hue, and the rostrum presenting a semilunar piceous margin, forming an indurated apex, with a curvilineal lateral prolongation at the base towards

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the eyes. The eye-shades are found to present at the time of exit the usual fenestrated disc, consisting of a number of minute transparences disposed in regular rows. In the course of a few hours the pupa-case assumes a light castaneous tinge, which continues gradually darkening as the occult nymph approaches maturity, until at length discarding its slender pellicle, and advancing from its previous retractile position closer to the operculum, the black head from within produces a darkening effect upon the whole. If previously to this moment a needle be passed transversely through the operculum, the nymph remains uninjured thereby, nor does the removal of the operculum leave the head prominently exposed. When the operculum has retained a castaneous tinge, and not separated readily on pressure, the parasite may be considered as still immature; or should the bee die before the parasite is well advanced towards its ultimate metamorphosis, the latter may be expected to perish, from the want of the accustomed moisture; nor indeed, if in a more forward state, does it appear able to accomplish its final moult under such circumstances, remaining therefore perfect in all its parts, but still enveloped in the pellicle of the nymph.

b. Of the Female.

When first porrected from the abdomen of the bee, the cephalothorax of the female *Hylecthrus* is nearly diaphanous, with a piceous marginal induration, corresponding anteriorly with the proboscis in the operculum of the male, the deflexion of which in both would appear to indicate a similarity in the position and proceedings of the larvæ prior to egress.

The convex shield on the upper surface exhibits anteriorly two glossy protuberances seated in an angular recess on each side of the disc, being at first of a brown colour, which afterwards disappears by the dispersion of the subjacent humours, leaving, however, the site more transparent. On the lateral margin, at the extreme corners of the occipital suture beneath the shield, are two piceous tubercles, occupying the place of the eyes; the discal shield extending at first in close proximity to the indurated piceous apex of the cephalothorax, where, shortly after protrusion, a separation is effected in the natural course of development, whence the upper region of the true head becomes partially exposed. The superior lip, broad and rounded at the sides, traversed at the base by a delicate sutural line, is furnished in the centre with a small quadrate emarginate plate, having on each side a kind of obtuse palpiform process, terminating in a glossy

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tubercle, corresponding in position with those seen on either side of the rostrum in the operculum of the male; and in approximation to these, curving round from the base, are two deflexed shining corneous appendages, which may be considered equivalent to the mandibular organs of the male; the inferior lip curling over beneath.

In the course of a few days the apical region of the squamous disc becomes so much vaulted and foreshortened, that by a comparison of two female parasites bred from the same bee, it would appear as if in one of these an anterior lobe had been thrown off as an operculum, on a line corresponding above with a well-defined sutural curve on the concave surface below, marking the extreme limit of the true larva head, having, however, the vaulted prothoracic segment still partially carried forward hood-like above.

On a front inspection of this semi-lunar arched aperture in prolific females, a delicate membranous pellicle may be discerned within, (sometimes attached to the thoracic hood, and at other times separated,) presenting a well defined arcuate anterior margin, porrected beneath the convex shield, and corresponding with the prothoracic arch, whence it may be inferred that this disjunction is produced in like manner by a natural separation of parts; the base of the orifice being connected by piceous lateral nervures, swerving upwards from the lower region of the œsophagus towards the larva mouth in front.

On removing the superincumbent convex shield, the quadrilateral thoracic duct, already perceptible through the disc, is found covered throughout with this flatly distended pellicle, which, for reasons afterwards explained, must be considered to extend over the whole of the thoracic region. This duct, henceforth serving as the vaginal channel, continues gradually widening until it reaches the soft abdominal segments; and eventually is used by the hexapod progeny as a kind of vestibule or marsupium for egress and ingress, according to circumstances, as noticed by Dr. Siebold, and witnessed also by myself. It has never occurred to me to find ova or immature larvæ therein, as in the instance alluded to by Mr. Newport;* in which case, however, the abdomen of the parasite having been previously "ruptured," the ova may possibly have been displaced.

At the origin of the mesothorax, where the disc of the shield is much inflated, a minute stigma may be traced on the lateral

* Linn. Trans. vol. xx. p. 337.

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margin; the metathorax exhibiting a more conspicuous protuberance towards the basal angles of the thoracic shield, preceded by a well-defined stigma, visible on the marginal rim at the origin of this segment, and communicating with a deflexed nervure or tubular process, carried obliquely to the base of the thoracic channel on each side. These meso- and metathoracic stigmata may be considered to offer an analogy to the sockets of the pseudelytra and wings in the male.

Looking also to the original condition of the hexapod larvæ, and to their subsequent metamorphoses, it may be assumed that up to the moment of their protrusion from the abdominal segments of their victims in the pseudo-pupa state, both males and females have undergone similar and corresponding changes; whence it follows that the ultimate larva-skin or pupa-case, discarded by the male, and the exuviæ of the nymph, must co-exist in the female, which does not divest herself of either.

In fact, after having removed the upper region of the cephalothorax as aforesaid, on making a horizontal section of the subjacent parts, the existence of a separate inferior region of the cephalothorax, forming with the upper a complete exterior sheath, may be readily perceived, leaving the internal cephalothoracic organization distinct, with the vaginal duct entire; the pellicle covering which, and next in succession, (corresponding anteriorly in extent and arch with the apical margin of the prothoracic hood,) being equivalent pro tanto to the exuvial skin of the nymph; the true imago remaining intermediate, and exhibiting on the transverse sutural line at the base of the head, occupying a retractile position beneath the said porrected pellicle, two minute rufescent discal tubercles on the upper surface, which may possibly indicate the rudimentary condition of the antennæ. Thus an incomplete metamorphosis, analogous to that of the male, may be traced in the female, the desiccated outer tegument of the cephalothorax being only the incipient pupa-case of the real pupa and imago conformation within.

8. *Relative Position of the Dorsal and Ventral Surfaces.*

Whenever opportunities have presented themselves of ascertaining the position of the males prior to exit, I have found that the *Xenos* and its allies (namely, those parasites obtained from *Polistes*, *Oplopus*, Wesm., and *Ancistrocerus*, Wesm.) emerged from the pupa-case, as recorded by Dr. Siebold, with the ventral region uppermost; whereas the *Hylecthri*, as well perhaps as *Stylops* and others parasitic upon the softer bodied *Mellifera*,

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usually present themselves in a converse position, with the *dorsal* region upwards; the back of the parasite in the former case being turned towards the back of the wasp, and in the latter case the ventral surface of the parasite resting on the back of the bee.

On the other hand, from the corresponding indications in the opercula of *Xenos* and *Hylecthrus*, and from a comparison of the projecting hood of the prothorax in the pupa-cases of the former with the analogous vaulted orifice in the females, &c., it is scarcely questionable that the relative position of the whole of these parasites on emerging from the abdominal folds is uniform in all cases, unless when protruded from the ventral segments of their victim.

Upon examining the orifice of the pupa-case of *Xenos Rossii*, presented to the Society (No. 2), from which the operculum has been separated, a sharp angular prolongation bent upwards is visible on the inferior margin, as if the abdominal segments of the wasp, between which the parasite had penetrated, had exercised too stringent a pressure upon the under side of the prothorax, thereby interfering with the aperture, which is rather oblong than circular, and bipartite in consequence of the bent up prolongation mentioned above, which must considerably impede the egress of the imago, as experienced by myself on one occasion when endeavouring to extract from the pupa-case the male of *Xenos Heydenii* after death.

No such obstacle is encountered in the pupa-cases of *Hylecthrus*, where the orifice retains the original circular form of the full fed larva, and the nymphs are found with the ventral region downwards, although I once observed in a reversed position a male of *H. rubi*, which had perished when in the act of divesting itself from the pellicle of the nymph.

The following inferences would appear to be deducible from the above recited facts: namely,

1. That the *pupa-cases* of the males in *Xenos* and *Hylecthrus*, &c. *correspond* in position.

2. That the position of the perfect *males* on emerging usually differs in *Xenos* and *Hylecthrus*.

3. That one or other must therefore turn within the pupa-case, a faculty which both appear to possess as nymphs.

4. That the *females* of all Strepsipterous parasites obviously coincide in position.

5. That in the *pseudo-pupa* state the *males* and *females* protrude between the abdominal segments of their victims in a similar position.

6. That it would therefore seem scarcely doubtful that the

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convex upper surface in the *females* corresponds with the *dorsal*, and the *concave under* surface with the *ventral* region.

9. *Exit of the Imago Male.*

After the first burst, produced apparently by the parasite pressing forcibly against the operculum, the head and shoulders being instantaneously protruded on this falling off, a slight effort suffices to liberate the pseudelytra and first pair of legs; when all these organs idly beating the air and agitating incessantly, much exertion is made to effect a passage for the second pair of legs, where the principal detention occurs; after which a few jerks up and down speedily serve to release the metathorax and abdomen; the imago forthwith winging its flight towards the light, where it continues flitting up and down until its fragile frame becomes exhausted, and it sinks powerless below, still vibrating its wings but unable to rise again.

I have never succeeded in retaining them alive beyond the day of exit, and indeed they have not often survived more than a few hours, generally between two and three. Jurine, who was equally unsuccessful in this respect, suggested that their premature death might be occasioned by the continual blows received when coming into contact with the glass; but the same effects have been produced when I have allowed them to emerge within a pill box covered with fine muslin at top and bottom, and freely exposed to a current of air, with moistened cotton placed in front. Yet during their brief term of existence they are not so weak and helpless as may be supposed, for on one occasion when three male *Hylecthri* were obtained alive from a dead *Hylæus*, the first which exhibited itself commenced dragging the bee about behind him, together with his unemancipated comrades, until he succeeded eventually in effecting his escape from the pupa-case.

Sometimes the parasite has been observed to twist round upon the dorsal segments of the bee while making its exit, and then resume its original position, the whole operation occupying usually but a few minutes, and occasionally less than one. The ordinary period for quitting the pupa-case, in the *Hylecthri*, would appear to be about the eighth day after their first protrusion; nor upon careful investigation have I found any complete their final metamorphosis sooner than this, although sometimes protracted a day or two later. The darkening of the operculum serves to indicate the immediate presence of the imago in contiguity to the fenestrated lattices, watching for a fitting opportunity to effect its exit; when exposure to a full light, without sun, is sufficient to induce

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it to make the necessary efforts for this purpose; nor are the parasites dependent on such occasions upon any assistance from their foster parents, I having on several occasions found them accomplish their deliverance by their own unaided exertions after the death of the latter, by placing the still moist bee in a glass tube on the window frame, having the operculum of the parasite directed towards the light.

To whatever cause the early death of the male parasites may be attributed, it is certainly retarded by detention within the pupa-case. I once found one alive five days after the death of the bee, and the thirteenth from the first appearance of the pupa between the abdominal folds: and in the case of Mr. Pickering's stylopized *Andrena*, found on Christmas Day, the parasite would probably have retained its pupa domicile for a much longer period.

10. *Uniformity of Sex in collaterally developed Parasites.*

I now proceed to offer some remarks upon the sexual economy of these parasites, and in the first place to notice the marked tendency which exists in those nurtured by the same Hymenopterous insect, to exhibit, when more than one is produced, a uniformity of sex.

These coincidences have been witnessed on so many occasions that they can hardly be ascribed to accident alone; twenty males and fourteen females of *Hylecthrus* having been obtained in corresponding pairs; twelve males and three females occurring by threes, and similar effects being also noticed in the parasites obtained from *Polistes*, *Oplopus*, and *Ancistrocerus*; nor have I ever found both male and female parasites associated in the same individual.

On the other hand, it is certain that both sexes of *Stylops Spencii* were met with by Mr. Pickering in one *Andrena*, as the figures given thereof clearly indicate;* so that in attempting to account for this agreement in sex as the usual, though not invariable, concomitant of such association among Strepsipterous parasites, subjected to the like conditions and influences during the whole period of their larva-growth, the result would seem to be attributable rather to the operation of some causes antecedent to the primary attack, than to influences derived subsequent thereto; and hence, following up the inquiry to the hexapods, and the ova from which they emanate, we are led to consider from what start-

* Trans. Ent. Soc. Lond. Vol. I., p. 172, and Pl. XVII.

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ing point that divergence originates which eventually conduces to so marked a contrast between the highly developed external organization of the male, and the retroactive internal concentration of the vital energies in the female; or, as Dr. Hermann Burmeister has described these opposite tendencies, the active and passive agency displaying itself by "preponderance of evolution" in the one case, and "predominance of involution" in the other.*

Some analogous instances of homogeneous development are met with among those Hymenopterous insects which construct their larva abodes in a consecutive series, the sexes being retained distinct and separate, the cells of the one terminating before those of the other commence. So also among the *Vespidæ*, and in *Polistes* especially, a complete series of cells is at one time exclusively devoted to males, and another of larger dimensions set apart for females only, the ova producing which are consequently deposed in a continuous series: and the development of the fecundating principle being promoted by a difference in the quantity and quality of the food supplied.

It would seem, then, not unreasonable to attribute to Strepsipterous insects the tendency to disseminate their ovoviparous progeny in a sexual series, those attaining maturity about the same time, and emanating from the same ovarial division, being endowed as such with the constituent characteristics of one particular sex; although instances may occur in which both sexes have been nurtured by the same bee under precisely identical conditions and influences.

11. *Effects produced by the Parasites upon the reproductive Powers of their Victims.*

In attempting to account for the aforesaid associations, a preliminary difficulty presents itself in the supposed sterility of the insects attacked, whose vital functions are obviously affected thereby to a considerable extent, as many well-attested facts serve to establish.

That such a result should ensue in cases like that of the *Andrena tibialis*, from which three specimens of the *Stylops Spencii* were obtained, is scarcely problematical; and may also occur whensoever the highly-developed organization of male parasites has been acquired at the expense of their victims, the effects produced being frequently exhibited in the absorbent influences upon

* Burmeister's Manual, translated by Shuckard, sects. 133 and 206.

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the abdominal region, which is crippled and distorted also to a considerable extent by the desiccated conical pupa-cases of the male parasite, but apparently scarcely incommoded by the pressure of the female.

Mr. Newport indeed on one occasion, when only a single specimen of a female *Stylops* had been nurtured, found the oviducts of the bee "of ordinary length and size, but the ovaries entirely undeveloped, and scarcely larger than they are at the period when the bee-larva passes to the state of nymph. They contained only the germs of a few very imperfect ova."*

On the other hand, when speaking of the manner in which the hexapod larvæ of *Stylops* are transferred to the cells of their victims, he observes, "they cling fast to the hairs on the body of the wasp or bee in which they have been hatched, and are transported by the insect to its nest."† And again, "the *Stylops* hatched within its parent in the abdomen of the bee, issues forth and clings to the hairs which cover the body of the fated insect, and thus at once has a means of conveyance on the bee to her nest, in which it is to be fed."‡

These remarks, which necessarily assume the victim to be capable of constructing brood-cells, and of depositing eggs therein, are in perfect unison with Dr. Siebold's views upon this subject, as expounded under his seventh result, wherein he states, "Die sechsbeinigen Strepsipteren-Larven kriechen auf dem Abdomen der *Hymenopteren*, in welchen ihre mütter wohnen, munter umher. Diese Strepsipteren-Larven lassen sich auf diese weise in die nester der *Hymenopteren* tragen, wo sie alsdann gelegenheit finden, sich durch die weichen Körper-Bedeckungen der Hymenopteren-Larven hindurch zu arbeiten, und in die Leibeshohle derselben zu gelangen."§

If, indeed, in accordance with the opinion first suggested by Kirby, and generally assented to by others, as to the probable effects upon the reproductive powers in the case of the male parasites, the same results be also attributable to the females, and their hexapod progeny consequently be always dependent upon fortuitous means of access to the larva-cells of prolific individuals; the circumstance of the subsequent co-ordination of the sexes in these parasites, indiscriminately dispersed in the first instance and assembled at random afterwards, could only be ascribed to some

* Loc. cit. p. 335. † Loc. cit. p. 334. ‡ Loc. cit. p. 350.
§ Weigmann's Archiv für Naturgeschichte, 1843, p. 139.

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influence operating during the period of larva-growth, which we should scarcely be warranted in assuming.

How, moreover, should we account for the circumstance of the *Polistes*, the *Hylæi*, the *Andrenæ*, the *Odyneri* and others visiting simultaneously the same flowers and localities, being always attacked by their own peculiar species of parasites, and these retaining unimpaired their consistent associations in one unbroken line of descent?

If, again, it be averred that out of a number of hexapods promiscuously conveyed to the cells, those only which may prove to be of precisely suitable condition and habits obtain an available domicile, this would scarcely hold good among nearly-allied groups, nor can it be conceived that the hexapods themselves should be enabled to discriminate their appropriate abode, where no palpable difference may exist in the store, before even the larvæ upon which they are to subsist are extant in the cells; still less that these hexapods, produced in such myriads, should not, that I am aware of, like the yellow hexapods of *Meloe*, described by Mr. Newport, be frequently met with in profusion upon certain flowers, as well as upon various Dipterous and Hymenopterous insects.*

While, therefore, the sterility of the victims in certain cases may be deemed incontestable, the general enunciation of this principle would appear to be incompatible with the known conditions affecting the perpetuation of the species in the parasites, although a large proportion of these must necessarily perish in the hexapod larva state, without obtaining a suitable abode—excessive numbers serving to provide, as in many other well-known instances, a compensating medium in this respect.

Some hexapod larvæ of *Hylecthrus* having on one occasion been placed by me upon a very diminutive *Polistes* larva, I found them attach themselves without hesitation in the usual manner, remaining affixed thereto, without, however, succeeding in penetrating, nor did they afterwards abandon the position so taken up. If, however, the hexapod larvæ of all Strepsipterous insects be left, in the ordinary course of events, to chance conveyance by any bee or wasp to any cell to be reared, as occasions may offer, upon the larvæ of any victim answering to certain required conditions, the manner in which those conditions would often be found fulfilled among allied genera and species must lead to interminable confusion in the distribution of the parasites, instead

* Loc. cit. p. 310, et seq.

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of each being retained, as at present, within its own allotted sphere.

12. *Inferences as to double-brooding in the Xenos.*

Having been induced, on a former occasion,* to hazard a conjecture as to the existence of double broods in *Xenos*, from certain deductions drawn in connexion with the known economy of *Polistes*, and the early appearance of the hexapod larvæ of the parasites, as noticed by Dr. Siebold (their identity,† however, with those of *Xenos* requiring confirmation), the following facts, which have since come under my observation, may be deemed to afford some corroborative testimony in this respect.

On the 4th of July, I captured at large a *male Polistes*, bearing a well-developed female *Xenos*, having the vaginal orifice fully expanded. This *Polistes* was necessarily reared from a larva of the same year, since none but females hybernate. The *Xenos* must consequently have been produced from a hexapod deposited in the larva cell of the *Polistes* about the same period. But this male *Polistes* was doomed to perish before the ensuing winter; therefore, any progeny to which its parasite might have given birth, if available for the continuation of the species, would require to be introduced forthwith to the larva cells of another *Polistes*, in conjunction with whose female brood the young hexapods might again be enabled to fulfil the required conditions of maturity and fecundation, and thus transfer their posterity, together with the hybernating *Polistes*, to the following year. Under any other circumstances, it must be assumed that all female parasites met with in the males of *Polistes* (which Rossi states to be more subject to such attacks than the females ‡) can take no part in the continuation of the race.

Similar deductions may also be drawn in the case of the female *Polistes*, exhibiting three prolific females of *Xenos*, already adverted to when describing the proceedings of the hexapods so obtained. This was on the 17th of July; yet in the preceding instance of the male *Polistes*, it has been shown that an early brood or series of hexapods had already finished their transformations and attained the perfect state at least a fortnight earlier. On the other hand, it is manifest that these hexapods produced subsequently, must secure a larva-domicile and accomplish their metamorphoses before winter, in order that when the *Polistes* quit their hybernacula in the spring, the *Xenos* females may dis-

* Trans. Ent. Soc. Lond. Vol. I. (N. S.), p. 50.
† Loc. cit. p. 143; Results 29 and 30.
‡ Faun. Etrus. Mant., Append., p. 115, note.

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pose of their hexapod progeny as required, and thus complete their destined cycle of existence.

13. *Impregnation of the Female.*

It only remains to notice some experiments made as to the pairing of the sexes in the *Hylecthri*, I having on various occasions, when male parasites were obtained, selected bees bearing specimens of their apterous partners for the purpose of introducing these into the glass tubes containing the former. More difficulty, however, being experienced in retaining the bees alive when nurturing female parasites than when encumbered with the conical pupa cases of males, these experiments were for some time limited to newly-protruded specimens of the former, which the males were in nowise disposed to notice; although, while the latter were incessantly quivering up and down towards the light, I was enabled to bring the females conspicuously before them by keeping the bees turned in that direction, so that the male parasites were continually traversing their path, or even crossing over them.

Conceiving at length that these female parasites had possibly not attained the required degree of development, I selected one which had emerged five days previously, placing the bee in the same bottle with two male parasites whose exit from the pupa-case had just been accomplished, when impregnation was several times attempted on the part of both males; but the *Hylæus* being in a feeble condition, and in fact dying later in the day, was frequently falling from side to side, having no power to retain a firm footing anywhere. The abdomen of the male was on each occasion strongly recurved in the direction of the squamous cephalothorax of the female, the same proceeding being noticed ten or a dozen times, the males flying off and returning at intervals. They, however, as usual, only maintained their activity for about the space of two hours, after which they remained exhausted and helpless, so as to be shaken out on paper without risk of escape.

About a fortnight later another opportunity presented itself of witnessing similar results. A bee exhibiting a female parasite, having completed its transformations on the 25th June, was placed the same day in a phial containing a newly-issued male *Hylecthrus*, without the slightest notice being taken of the former, although repeatedly brought in the way of the latter. The following day the experiment was renewed with other males, some of these inclosed in a muslin-covered box, but without effect. On the third day, having introduced the same *Hylæus* to a phial containing a male parasite which had just quitted the pupa-case, the latter immediately settled upon the abdomen of the bee, qui-

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vering his expanded and uplifted wings, while recurving the abdomen considerably in the direction of his secluded partner, and returning on several occasions to repeat the same process, although the pairing may not have been fully consummated on any of these occasions, the *Hylæus* being, as in the former instance, in a disabled state, and dying in the course of the day.

Descriptions of new Species.

1. *Xenos Heydenii.*

Long. corp. $\frac{1}{12}$ unc., mas.

The male is much smaller and more elongate than that of the *Xenos Rossii*, having also the antennæ less lanceolate. The female has the cephalothorax more acuminate and of a dark piceous hue, with a strongly-marked longitudinal impression near the lateral margin on each side of the prothoracic disc.

Inhabits the bodies of *Ancistrocerus deflendus*.

Of the male I only obtained a single specimen, extracted in a bad condition after death, the *Ancistrocerus* bearing the pupa of which, having been taken on the 5th July, died on the 8th, when on partially removing the operculum the nymph of the parasite was found still pale; but it changed from white to black on the 9th, and was extracted dead in the imago state on the 13th. The operculum also, on internal inspection, differs from that of *Xenos Rossii* in its markings and transparent portions.

Of the female I obtained several specimens, captured from the 29th June to the 10th August, and among these some producing hexapods on the 13th July and 9th August. The *Ancistroceri* were chiefly met with on the flowers of the wild peppermint in localities sheltered from the wind.

I have been induced to attach to this species the name of the Senator Van Heyden, who is recorded in our Transactions* to have met with a new *Xenos* in a small *Odynerus*, which, however, he conceived to have been the *O. auctus*.

Found in the neighbourhood of Prevesa and the Ambracian Gulf.

The *Ancistrocerus* from which this was was obtained, apparently an undescribed species, has the clypeus black, with a well-defined broad yellow band across the base and embracing the angles on each side, a truncate frontal mark, a spot in front of each eye, and a streak behind their posterior margin, yellow. *Antennæ* black, the basal joint yellow beneath. *Mandibles* straight, somewhat rufescent, yellow at the base, with the inner dentate margin

* Trans. Ent. Soc. Vol. I. p. lxxiv.

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black. *Thorax* anteriorly banded with yellow; the scapula of the wings and a spot beneath the same of variable size, the posterior angles more or less, and two transverse bands across the scutellum, the anterior one usually broadest, entire or bilobed, yellow. *Abdomen* having the posterior margin of each segment except the last in the female, and the two last in the male, broadly yellow, which in the first segment is dilated on each side towards the base; the second segment campanulate, with a large isolated basal pustule of the same colour on each side, sometimes entirely absent; all the segments having the yellow margins traversed by a close irregular double series of black punctures. *Legs* yellow, with the base of the femora black, and the apex of tarsi testaceous; body somewhat piceous beneath, the posterior margin of the second abdominal segment yellow. *Wings* hyaline.

The male differs in having the clypeus entirely yellow, or with only a small discal black marking, and the penultimate and anal abdominal segments bearing a yellow pustule.

Long. corp. 4 ..... 4½ lin.
Alar. exp. 5½ ..... 6 lin.

I propose to designate this species by the appellation of *A. defiendus*, in allusion to its parasitic infliction.

2. *Xenos Klugii.*

I have only seen males of this species, parasitic on the *Odynerus* (*Oplopus*, Wesm.) *rubicola* of Dufour, which were obtained after the death of the *Odynerus*, extracted from its earthen cells in briars. It is somewhat smaller than the *X. Rossii*, the body black, the legs and antennæ pale, the latter elongate and tapering, and the operculum materially differing from that of the pupa-case of the former, nor, considering the very different economy of the *Polistes* and the *Odynerus*, can this parasite coincide in habit with the *X. Rossii*, or transfer its progeny through the medium of hybernating females.

Found in the same localities as the preceding.

Hylecthrus Sieboldii.

This species is parasitic on the *Prosopis variegata*, Panz., several specimens of the latter, producing female parasites, having been captured during June, July, and the beginning of August, on the flowers of the wild peppermint, and one of these with a brood of hexapod larvæ on the 5th July. Another of the same bees, bearing the exuviæ of a male parasite, was taken on the 16th July. The cephalothorax in the female of this species is distinguished by a broad yellow longitudinal band dilated towards the apex, and by a

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dark transverse line at the base, interrupted by the passage to the abdominal region.

Found in sheltered places on the peninsula of Prevesa. This *Prosopis* does not, however, nidificate in briars.

DIAGNOSIS OF SPECIMENS PRESENTED TO THE SOCIETY.

1. *Xenos Rossii* ♂ in the act of emerging from the pupa-case, having already cast off the pupa skin; the *ventral* region uppermost. (With *Polistes* ♀ captured July 15th.)

2. Pupa-case of another from the same species of *Polistes*, extracted entire, showing indented orifice; together with the operculum of the same; the cast off pellicle of the nymph at the extremity within.

3. *Xenos Rossii*, two females, protruding from the abdominal interstices of *Polistes*. (Captured July 5th.)

4. Hexapod larvæ of *Xenos Rossii*. (From another *Polistes*, July 18th.)

5. *Xenos Heydenii* ♀, with *Ancistrocerus deflendus* ♂.

6. *Hylecthrus rubi* ♂ in the act of emerging from the pupa-case; the *dorsal* region uppermost. (With *Hylæus rubicola*, var. *versicolor* ♂.)

7. *Hylæus versicolor* ♀ bearing two *pupa-cases* of *Hylecthrus rubi* ♂, with circular orifices.

8. Pupa-cases of *Hylecthrus rubi* ♂, with the opercula in sitû, one of which protruded from *ventral* segments of the bee. The parasites apparently immature within. (With *Hylæus versicolor*.)

9. *Hylecthrus rubi* ♂ in imago state.

10. *Hylecthrus rubi* ♀ on first emerging; a bred specimen. (With *Hylæus rubicola* ♂.)

11. Another bred specimen of the same in a more advanced state.

12. Pseudo-pupa of *Hylecthrus rubi* ♂ previously to protrusion. (With nymph of *Hylæus versicolor*; the apical segments removed.)

13. Feeding larvæ of *Hylecthrus*, in different positions. (In section of abdomen of nymph of *Hylæus versicolor*.)

14. Nymph of *Hylecthrus rubi* ♂, with pellicle longitudinally separating preparatory to exit.

IN SPIRITS.

15. Nymph of *Hylæus versicolor*, the last three segments of abdomen removed, showing two male pseudo-pupæ of *Hylecthrus rubi*, not previously apparent.*

16. Pseudo-pupa of male parasite, as recognized by eye-shades, and proboscis working for egress within abdomen of the bee. (With newly-developed *Hylæus versicolor*.)

* From the rostrum of that to the right (the left in Pl. XVI. fig. 5) a portion of yellow fluid was ejected on handling the nymph of the bee, whence the buccal orifice may be considered in a normal condition at this period.

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17. Immature white pupa of male parasite as just emerged from abdomen of the bee. (With newly-developed *Hylæus versicolor*.)

18. Pale nymph of *Hylecthrus quercûs* ♂, extracted from the pupa-case. (Largest specimen.)

19. Pale nymph of *Hylecthrus rubi* ♂, the wings distended. (Smaller pale specimen.)

20. Nymph of *Hylecthrus rubi* ♂ in a more advanced state, with the limbs of the imago more distinctly shown. (The larger dark specimen.)

21. Extremity of body of *Hylæus rubicola*, with bred specimen of the female parasite (*H. rubi*), extracted entire after the protrusion of the cephalothorax.

" DESCRIPTION OF PLATES.—PLATE XV.

Fig. 1—8. Details of pseudo-nymph of *Xenos Rossii* ♂.
1. Head-case seen from above; 2, sideways; 3, from front; 4, from within; 5, body, with head-case removed; 6, front orifice, showing raised conical under edge; 7, one of the spiracles; 8, extremity of body wrinkled, inclosing pellicle of true pupa.
9. *Oplopus rubicola*, Duf., with *Xenos Klugii*, S. S. S., ♂, inclosed in its pupa skin, with the head of another pseudo-nymph ♂; 10, antenna extracted from pupa skin of *X. Klugii* ♂ (basal joints not clearly seen); 11, head-case of pseudo-nymph ♂ from below; 12, from the front; 13, from within; 14, sideways; 15, portion of ventral surface near the head-case pointed (accidentally?).
16. *Ancistrocerus deflendus*, S. S. S., with *Xenos Heydenii*, S. S. S., ♀; 16, pseudo-nymph of *X. Heydenii* ♂ in pupa skin; 17, antenna extracted; 18, head-case of pseudo-nymph ♂ from below; 19, sideways; 20, from the front; 21, from within; 22, cephalothorax of ♀, 23, front of ditto magnified more strongly; 24, front margin seen in front.

PLATE XVI.

Fig. 1. *Xenos Rossii* ♂ escaping from dorsal articulation of abdomen of *Polistes gallica*.
2. *Hylecthrus rubi*, S. S. S., ♂, escaping from dorsal articulation of abdomen of *Hylæus rubicola*; 3, pupa of *Hyl. rubi* ♂; 4, ditto with pellicle longitudinally splitting preparatory to exit; 5, abdomen of pupa of *Hylæus*, with terminal segments removed, showing two pseudo-nymphs of *Hyl. rubi* ♂ not previously apparent (eye covers not coloured); 6, pupa of *Hylæus* with pseudo-nymph of ♂ parasite working for egress, the dark eye shades visible through tegument of bee-pupa; 7, head-case of immature white pupa of *H. rubi* ♂ just emerged from within the abdomen; 8, head-case sideways; 9, front of head-case more magnified; 10, extremity of body of *Hylæus*, with exuviæ of two males of *Hyl. rubi* after removal of their head-cases showing oval aperture; 11, extremity of abdomen of *Hyl. rubicola*, with *Hyl. rubi* ♀; 12, front of cephalothorax ♀; 13, ditto seen laterally; 14, upper pellicle of cephalothorax of ♀ removed from fig. 15, which thus shows the thoracic duct covered with its membranous pellicle; 16, cephalothorax of *Hyl. rubi* ♀ (bred) with fuscous markings in place of eye shades; 17, ditto with outer dorsal pellicle of upper membrane of thoracic duct removed, showing articulations.
18. Pupa of *Hylecthrus quercûs* ♂.
19. *Prosopis variegata*, with cephalothorax of *Hylecthrus Sieboldii* ♀ exposed; 20, the latter magnified greatly, showing two larvæ within the thoracic duct." [J. O. W.]

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XX. *On the Duration of Life in the Queen, Drone and Worker of the Honey Bee; to which are added Observations on the Practical Importance of this Knowledge in deciding whether to preserve Stocks or Swarms: being the Prize Essay of the Entomological Society of London for* 1852. *By* J. G. Desborough, Esq.

"In tenui labor at tenuis non gloria."

For ages past the bee has many times occupied the attention of the naturalist, and numerous works have appeared under various titles, some treating of the management of the honey bee alone, and others of its management, as well as natural history; yet it is somewhat remarkable that none of them have treated on "The duration of life in the honey bee;" and although in some of the *bee books* an occasional sentence touching the age of bees may be observed, no connected or definite information or argument on that portion of the subject is to be found.

The poet Virgil in his fourth Georgic, alluding to this subject, says, "Neque enim plus septima ducitur æstas," but it is not very clear whether he alludes to the age of the bee individually, or to the duration of life in a stock of bees. "Stat fortuna domus," would incline us to think that the stock was here spoken of, and not the single bee.

A degree of mystery likewise pervades the volumes of the early writers on bees, and even at the present day "*bee superstitions*" are prevalent in all parts of the kingdom, and their influence is so powerful, that any attempt to alter the system of bee management practised by the forefathers of the cottage beekeepers, is looked upon with a suspicion scarcely to be credited unless experienced.

The system usually adopted by cottagers in keeping their bees affords but little scope for observation; indeed the only observations which can possibly be made under such a system are the external appearances of the hives or stocks; the queen is never seen, the combs containing the brood cannot in anyway be inspected, and even after the murderous hand of their master has deprived the stock of its existence, the bees are unceremoniously buried without notice; we cannot, therefore, expect much assist-

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ance from such a system to aid us in our present research, but still an occasional inference may be drawn from the little that may be thence gathered, as will hereafter be seen.

When, however, bee keeping is treated as a science, and the beekeeper's study is to adopt every expedient to secure the comfort and well-doing of his bees,—when his hives are constructed in such a mode, that daily and hourly observations may be made on the proceedings of his bees,—when he can proudly say, by care and management he has preserved his stocks in health and prosperity for years, instead of killing them ruthlessly in the first season of their existence,—any steps tending to assist him in so laudable an object, or to encourage him to persevere, deserve to be hailed with delight; even on the score of profit it might be easily shown that the old system of taking honey by killing the bees ought at once to be abolished, but such a course of argument would be foreign to the present essay.

Apart from any consideration on the ground of bee management, the hives in use under a scientific mode are much more adapted for observation of all kinds, and therefore it will be to them we must look for help in treating our present subject; and when a record of observations has been kept, and a series of comparatively unimportant notes are brought into one focus, the information contained therein will assume so different a shape, that even the observer himself will scarcely be persuaded that his conclusions are faithfully drawn, so valueless did the notes appear in their crude state.

The writer of this essay has kept a series of memoranda as to the proceedings of the stocks of bees in his apiary, more particularly as to their swarming, since the year 1839; and although such notes were originally commenced as an amusement, it was soon perceived that for practical purposes they were of great importance: a careful digest of such memoranda, in the nature somewhat of a pedigree of his stocks, is the groundwork of this essay.

It will hardly be necessary after the above remarks to add that he has pursued the humane system of bee management, that his hives are therefore constructed so as to afford sufficient means of observation; but a short digression from the subject for the purpose of saying a few words on a hive, which may truly be called "An Observatory Hive," may not be deemed out of place. This hive is so constructed that each cell is distinctly visible to the bottom. The hive is in its principle unicomb; at the same time, by

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a peculiar arrangement of the combs, the bees are not so widely distributed as in the ordinary unicomb hive. Both sides of every comb can at any moment be inspected, and this without the least interruption to the labours of the bees; the queen can at all times be found, and the laying of eggs by her has been so frequently seen, that it has ceased to be a matter of curiosity (he will not say of interest) to the writer. The difficulty heretofore has been to keep the stock in this hive alive during the winter, and this has not yet been attained (three trials having proved unsuccessful); but this season the hive, instead of being in an apiary, has been established in one of the rooms of the writer's dwelling-house,—in fact his bed-room; and at this period (December) he has the satisfaction of seeing the stock in perfect health and strength, and has every prospect, by the means he is adopting, of overcoming the difficulty before experienced of keeping the bees with which the hive is stocked alive, and thus actual daily observation can be made throughout the winter.

After these few introductory remarks, and the above short sketch of the means we possess for observation, we proceed at once to the consideration of the subject of the essay.

Age of the Queen.

From the very peculiar habits of the queen bee, differing in all respects from the other inhabitants of the hive, in her constantly abiding within the hive or stock of which she is solely the monarch, and from the difficulty and almost total impracticability of any attempt to identify her by marking or mutilation of any kind, nothing short of the closest observation during a number of years, a diligent noting of facts, and a careful and unprejudiced examination of the whole, will enable an apiarian to venture an opinion, much less to form a conclusion, as to the duration of life in this insect.

That the queen bee exists for a longer period than one year is easily to be shown, but for how much longer is a question not so readily answered. Trace the existence of a queen; and for this purpose select a stock of bees which has already thrown off its swarm led by the old queen, and also its cast led by a young queen; the stock will then be left to the government of one young queen, which was in embryo at the departure of the swarm (all the other young queens we will presume to have been killed with the exception of the one selected to reign); this young queen was of course produced from an egg laid at some period of the summer,* say of the year 1849, and for sake of identity we will

* Proved by my observatory hive, see note in p. 149.

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call this stock A. The same season, 1849, our young queen commences her work of laying eggs, thereby recruiting the population of the hive, now so greatly reduced by the departure of the swarm and cast; and as the eggs she produces at this period are all workers, the numerical strength of the hive is so far re-established as to enable it to brave the dangers of the winter season. The next year, 1850, our young queen of the previous year may be styled an old queen, her progeny in hive A has increased the population of the hive so much as to render a swarm necessary to be thrown off, and the swarm of 1850, which we call B, is led by the queen of the year 1849. The same proceeding occurs with our swarm of 1850, and the same necessity is occasioned in the year 1851; and the swarm issuing in that year, which we will call C, is again led by our queen of 1849: this would go on ad infinitum were not the insect tribe under the same sentence as man and all things on the face of nature, "once born and once to die." When that death takes place in the queen bee is our important question.

We have traced a queen from the summer of 1849 to the summer of 1851, and the proof that the same queen has existed for these three years is this, that the stock of 1849 threw off a swarm in 1850, and from the swarm of 1850 a swarm issued in 1851; and as swarms are led by an old queen, both the swarms of 1850 and 1851 are led by the same queen, being the one produced in the year 1849, under the circumstances with which we started the history of our selected queen. That it is the same queen is proved by the fact that all the young queens would be left in the hives A and B at the time of the issuing of the swarms therefrom; and as the swarm issued from hive A in the first summer after the birth of our selected queen, and from hive B in the first year of its existence after being hived as a swarm, it must be apparent (unless the fact of the swarm being led by an old queen is disputed) that these swarms, respectively identified by the letters B and C, were led by the queen brought forth in the year 1849 from the hive A; but had the stocks marked A and B omitted to send forth a swarm at the times we have stated, then it would not be the fact that the swarms issuing from hive A and B were led by the same queen, as we shall presently endeavour to show.

Now the swarm of 1851 (C), although living in the year 1852, does not in that year send forth a swarm; still the stock lives and flourishes, the bees are numerous, and apparently the population

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is strong enough to follow the usual order of nature; the multiplication and the preservation of the species by the natural division of swarming has not this year taken place. Why has this instinct in the bee, at other times so strong, been disregarded? Why has the natural economy of the hive been disturbed? What is the solution of this paradox?—the natural death and the renewal of the queen. Age and decay have done their work, the natural powers of the insect have become exhausted, and she has quietly and peacefully departed, leaving her subjects to mourn her loss for a short space of time only, for she has left behind her an offspring of the royal stock, a successor to the throne is in embryo, and all this taking place whilst numbers of drones are in the hive produced from eggs laid by the late queen; no fear need be entertained of the impregnation of the new queen in order to ensure the future existence of the stock. The young queen accordingly comes forth, is impregnated, and carries forward the necessary routine of the hive. This young queen, like her predecessor, begins to lay eggs within five days of her coming to maturity,* and at the end of a further period of twenty-one days worker bees are again added to the population of the hive and all is again well; in fact the hive is now precisely in the same state as the hive with which we commenced our proposition, with this exception, that in the first case the old queen had been disposed of by departing with the swarm, and in the present case she has paid the debt of nature—death.

But what proof have we of this state of things taking place from the outward appearances of the hive and the proceedings of the bees themselves? We have this: towards the end of the month of May, or the beginning of the month of June, we may often observe a large quantity of bees hanging on the outside of the hive, sometimes extending a considerable way underneath the alighting board, or in any place where a convenient hold can be obtained, apparently listless and idle; no work is going on, although honey might be obtained in abundance were the bees inclined to work, and even if the weather should be what the most anxious apiarian could desire the bees still remain in this extraordinary state. Although stimulated in other years to seek another abiding place for the over abundant population of the hive by swarming, this year they seem to have no desire or intention to do so; their natural instinct seems to be blunted; in a word, the

* 1852 July 16 Stocked observatory hive with a cast.
„ „ 21 10 P. M. Queen depositing eggs.

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stock *will not swarm:* (of course we are now speaking of a stock of bees in a common straw hive, having no means of affording extra room for the increased number of bees. Yet even in a stock of bees, where ample means are at hand for affording working room, the bees will occasionally use the extra space for this lying out, as it is termed, instead of using it as a storehouse for honey). What then is the explanation of all this? We may occasionally, when a hive is in this state, see the bees which are lying out drenched with rain; yet there they still pertinaciously hang. Why then will not the bees remedy the inconvenience by forming an independent colony? simply because they have no queen in a proper stage to lead them forth. The old queen has died a natural death, leaving young queens in various stages of forwardness, and until one is matured the swarm cannot go forth; the time for this perfection of the queen has been passed in the listless idle state we have been describing, and by the time the young queen is matured, particularly if unfavourable weather should ensue, the season will be so far advanced that the stock will not swarm. Here then is the secret of the stock not swarming, the renewing of the queen is the cause of all; the queen existing in the year 1852 in the stock we marked C has been the leader of swarm after swarm, has successively reigned in the hives A, B and C, has left her home time after time until nature has become exhausted and she has died full of years, and her successor reigns in her stead.

That this change of queens takes place in the summer after the hatching of drones, or at all events after the laying of drone eggs, is very evident; for were it not so the young queens would be barren for the want of the drones to impregnate them, and the inevitable loss of the stock would be the consequence.

It does not invariably happen that the change of queens is always preceded by the hanging out of the bees, that will depend in a great measure on the numerical strength of the stock, and the amount of space provided for them in the hive; but still the stock, though strong enough to swarm, will not do so, and when the great inconvenience and danger to the bees in hanging out is taken into consideration, it strengthens the argument that some dire necessity compels them to endure the inconvenience and risk the danger. Again, the renewal of the queen may take place without any other symptom being present than the nonswarming of the stock; the honey gathering may not be interrupted in any degree, nor the ordinary labours of the hive suspended.

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This renewal of queens, it may particularly be observed, is in every respect analogous to the natural state of a hive in swarming, with only one exception; viz. that the old queen, instead of going off with the swarm, dies. The state of the hive at the period of the death of the queen in the one case, and the departure of the swarm in the other, is exactly the same: in both cases drones and drone brood exist in the hive, young queens are in embryo ready to come forth in a few days, and worker bees and worker grubs are to be found in abundance; the stock in both cases is thereafter left to the government of the young queen, and with the solitary exception of the departure of the queen with a portion of the population, the two instances of swarming and renewal of the queen are exactly similar: to the stock therefore at the end of the season the result is the same.

Much difference of opinion has existed whether the swarm is led by the old queen or a young one, and in support of the view that the swarm is led by a young queen, the analogy of the swarming of ants has been sometimes alluded to, where undoubtedly the young queen leads; but the queen ant, immediately her colony is settled, casts aside her wings, as no longer needed, thereby utterly preventing herself from ever afterwards leading a swarm. The queen bee does not do so, and therefore the analogy no longer exists; but, on the contrary, it may be contended that the queen bee retains her wings expressly for the necessity of leading the swarm.

It may here be observed, that if the view taken above as to the renewal of queens is correct, when a stock of bees throws off its swarm late in the season, and after such renewal (but which will rarely happen), strictly speaking it is not a swarm, but only a cast: a swarm, properly so called, is led by the old queen capable of producing eggs of all kinds,—queens, workers, and drones, whilst the queen leading the swarm thrown off under the circumstances just detailed is a young queen, and will produce in that season only worker eggs. That the queen leading a swarm is capable of producing queen eggs, is at once evident from the fact, that such swarm in favourable seasons will throw off a *maiden swarm*, and of course under such circumstances drone eggs must also have been produced, or the young queens left in the hive at the departure of the maiden swarm would be barren, and the loss of the stock ensue. In the case of a maiden swarm the old queen will have changed her habitation twice in the same season; whether this double swarming has any effect on the duration of her life future observation must prove.

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Several singular facts should be here noticed with reference to the proceedings of a cast, viz. that in the comb built by a cast in its first season, all the cells are of the small size used for rearing worker bees; no drone cells are built; the hive or box, unless very small, will not be filled with comb, and the space left unoccupied will be found to be that usually the position of the drone cells. It has occurred to our recollection in the preparation of this essay, that occasionally a hive stocked with *a late swarm* has been found not filled with comb, but the observation was not carried to the extent of noticing whether drone cells were absent; if such should hereafter be found to be the fact, that drone cells are wanting in the comb built by *a late swarm*, it will be a complete confirmation of the theory, that such late swarm was in fact only a cast, led by a young queen, and a complete proof likewise that a renewal of queens had taken place.

A cast, it will be seen, can never throw off a swarm in the first year of its existence, for the simple reason, that *only worker bees** are produced, and no drones or queens are produced until the spring succeeding its establishment as a stock.

The winter of the year 1851, and spring of the year 1852, was singularly fatal to the stocks of bees in the immediate neighbourhood of the writer of this essay, and a post-mortem examination with some certainty points to the death of the queens as the cause of the loss of the stocks. An opportunity was embraced of examining six of such stocks; scarcely a single bee was found in any one of the hives, and no trace whatever of the queen was visible; each hive was well stored with honey, so that starvation was not the cause of death; the hives were dry, and the bees had been apparently healthy, but they had in each case dwindled away, or had gradually deserted the hives. Four of these stocks had swarmed in the summer of 1851, so that the queens would be young ones; two of the stocks were alive as late as February, 1852, but there was no trace of breeding in the combs: what, then, was the cause of death in these instances? In the four stocks which had swarmed barrenness of the young queen might be suggested, but in the two stocks which had not swarmed such could not be the case. From a careful examination and consideration of these appearances, and the attendant circumstances, it must be admitted that the death of the queen was the source of all the mischief, but what was the real cause of her death is a mystery not so easily cleared up.

* Having stocked my observatory hive this year with a cast I can speak to this fact.

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As a contrast to the fatality amongst queen bees just noticed, we have made the following extract from the Note Book mentioned in this essay at page 146, and as an instance of the extraordinary number of queens produced from three of the stocks in an apiary of six, during that year (1847); and it is remarkable that in the same apiary, comprised of the same number of stocks, not one queen bee was killed in the year 1852, not a single swarm having issued from any one of the stocks in the apiary.

That the season must have considerable influence in the production of queens must be self-evident, otherwise why should stocks of bees in 1847 produce an over abundance of queens, and in 1852, under precisely the same management, produce none? Had only one stock omitted to throw off a swarm, it would be assuming too much to attribute the omission to the season, but when the influence extends to all the stocks in an apiary, and to great numbers of stocks in the immediate neighbourhood, the cause may then fairly be attributed to the peculiar season. Two of the stocks now living (1852) are the indentical stocks mentioned in the Note Book of 1847, numbers 2 and 4, one of them having been hived in 1845, and the other in 1846.

"YEAR 1847—*Stock No. 2.*

"June 12. Swarmed; deprived the swarm of the queen, and returned them.

„ 20. Cast; caught two queens; returned.

„ 25. Came out again, and joined bees from Nos. 3 and 4.

„ 26. They set to work well.

"*Stock No. 3.*

"June 5. Saw appearance of swarming after they had worked comb in a glass on the top of the hive; a queen's cell visible.

„ 6. Inverted the hive, hoping to destroy young queen thereby.

„ 12. Swarmed; deprived them of the queen, and returned the swarm.

„ 20. Cast, and I caught queen on the alighting board before she took wing.

„ 23. Cast again, and I caught queen again in the same manner.

„ 25. Came out again, and joined bees from Nos. 2 and 4 This stock died in March, 1848.

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"*Stock No. 4.*

"June 8. Heard piping, but never saw swarm rise, and never missed the bees as to numbers, either from the stock hive or glasses.

„ 10. Found young queen dead on alighting board.

„ 11. A swarm or cast issued; caught queen, and returned the bees.

„ 15. Came out again, and I killed queen as she was coming out of the hive.

„ 19. Came out again, and I killed two queens after they had settled; returned them.

„ 20. Caught another queen on alighting board.

„ 22. Came out again; deprived them of queen, and returned them.

„ 25. Came out again, and joined bees from Nos. 2 and 3. The bees from 2, 3 and 4 having all joined in one lump on swarming, I took them in two common straw hives; I afterwards dashed them all out on a white cloth, picked out three queens, and then distributed the bees amongst each of the hives 2, 3 and 4, and they all afterwards worked well. No. 4 produced 40 lbs. of honey in glass."

In the preparation of the portion of this essay treating of the age of the queen, the actual pedigree of a stock in the writer's apiary is stated; but upon making up, from the notes previously mentioned, the pedigree of other stocks, the period of the change of queens, evinced by nonswarming, was found not uniformly to correspond with the three years. In several cases the time was found to be four years, and in only one instance two years (the notes in the latter case were rather imperfect, in consequence of the stock having swarmed whilst the writer was absent from home, and it is not deemed safe to depend upon them); and although it may be deemed too presumptuous to assert that the age of the queen bee is in reality three or four years, yet the facts adduced above from personal observation, and the deductions and conclusions drawn therefrom, will be deemed a sufficient apology by the writer in thus stating his belief that his opinion is correct.

Before concluding this portion of our subject treating of the age of the queen, we may merely notice the experiments of Huber the naturalist, detailing the production of a queen bee from worker eggs; but as this renewal of a queen cannot be considered as a natural, but rather as an artificial one, it does not strictly fall

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within the province of the present essay, and the only point in which such experiment can assist us, would be to fix the date of birth of the queen bee, a date which can be as accurately fixed without the aid and risk of the experiment. So much doubt also has been thrown upon the existence of the power of the worker bees thus to create a queen, that we felt any argument, founded upon the production of a queen in the mode detailed by Huber, would be open to the same doubts as Huber's experiments. The question as to the power of the worker bees to produce drones is still entirely an open one, and it would seem that the reproduction of a queen bee alone from worker eggs, before the period at which the drone eggs are to be found in the hive, would only prolong the misery of the stock, ultimately to die from the barrenness of the queen; for without drones how could the young queen so produced become fertile? and unless the worker bees also possess the power of rearing drones from worker eggs, the mischief arising from the loss of a queen at those particular seasons when only worker eggs are to be found in the hive would inevitably be fatal. It would therefore be exceedingly important if the attention of apiarians was drawn particularly to this subject, that experiments might be instituted to prove the fact.

The writer of this essay is free to confess, that he was a sceptic regarding the production of a queen bee from worker brood, even up to the time of some portion of this essay having been witten, but an apiarian friend having two dead stocks not broken up in his apiary, which had died in the winter of 1851, gave them to the writer for examination, and in one (a stock of at least ten years old or more) he found, and has preserved, a most unique specimen of a queen cell in the midst of worker cells, wherein evidently a plebeian queen had been reared; this, of course, at once settles the matter in his mind.

Age of the Drone.

In entering upon this part of our subject we do not labour under so many difficulties, in collecting materials to form our conclusion as to the duration of life in this insect, as we do with respect to the queen bee. When drones are existing in a hive they are daily coming forth for an aërial trip, should the weather permit; and in every hive, whatever may be its construction, if it is in any way provided with a glass window, the drones may invariably be observed; still, however, the difficulty of individual identity exists.

Drones, or male bees, are not found in the hive at the time the queen commences laying eggs in the spring. Every one had been unmercifully killed or disabled, and expelled from the hive, in the

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preceding autumn by the worker bees; we can therefore date the birth of drones with accuracy. The drones generally make their appearance in May, in stocks unusually strong; they may occasionally, but rarely, be seen in April, and drone brood may be found in hives so late as August; and it is not uncommon to see drone grubs and the pupa in various stages brought out from the hives at the time the annual massacre of the matured drones takes place; total extermination of that class being evidently the object of the workers.

The ordinary limit to the life of the male bee may thus with certainty be embraced in the period extending from April to September, but that period is only the one *allowed* to the drones by the worker bees, and the natural life of the drone may be considered more the object of inquiry in the present essay than the period during which the drones are permitted to live.

That the drones would exist for a longer period if the workers did not destroy them, is evinced by the fact, that in a hive when by any accident the queen is not impregnated (and this more frequently happens to a cast), the drones still remain in the hive long after the month of September; but the very circumstance of their remaining in the hive unfortunately deprives us of the means of noting the duration of life in the drone, because the stock being in an unnatural state from the barrenness of the queen, dwindles away and dies, drones as well as workers, generally about the month of December, or it may be January, and this closes the scene of our observations; whilst were we to remedy the evil by furnishing the stock with a fertile queen, an immediate slaughter of the drones would take place. It may here be observed, that it is not always permitted to the drones to exist so late as July or August, but occasionally in a very populous colony the drones are killed and turned out of the hive in May or in the early part of June, and frequently, though not invariably, a second destruction of drones takes place at the usual period; this double destruction of drones has not yet, as we are aware, been satisfactorily explained, but one fact may be recorded which may assist in solving the mystery—that when an early slaughter of the drones takes place, the stock of bees *will not swarm* that season.

Having thus seen, that under all circumstances whilst the hive is in a natural state, the existence of drones is a merely permissive one on the part of the worker bees, and that whenever the state of the stock is such as to cause the workers to permit the drones to live, they exist as long as the workers themselves; we

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shall not be assuming too much in concluding, that the natural duration of life in the drone is the same as in the worker bee.

Age of the Worker Bee.

Here again we are beset with the difficulty of individual identification, and the worker bees are so numerous that any marking of the whole number existing at any one period in a hive is almost out of the question. The marking of a portion would not help us in any great degree; indeed, were a worker bee to be marked by any substance being attached to its body, or by a dot of varnish, paint, or any thing of that kind, in all probability it would lead to its untimely end in one shape or another, so that an experiment of that kind could not be depended upon; and were the marking not to be of a permanent character, the extreme cleanly habits of the bee would speedily lead to the obliteration of the mark. We cannot therefore obtain assistance in our research by any mechanical means of this nature.

Worker bees exist in the hive or stock at all seasons of the year; but whether they are the same bees is the question more particularly now to be discussed.

Let us enter into a calculation as to the number of bees produced in a hive at various periods of the year; and this though seemingly impossible, when reduced to a system is rendered simple, and the result accurate. It is a well-known fact, that in the month of January, from some cause or another, whether natural or otherwise will hereafter be seen, the worker bees are reduced to a comparatively small number, though that month is not always the time when the smallest number of bees are present in the hive. This number must be estimated, and it will be the only quantity which cannot be determined by actual calculation. It is true we might by fumigation determine the real number; but such a proceeding at this period of the year would very likely lead to the death of the stock. We may safely take the number in a fair stock at from 6000 to 8000; on fumigation the stock would be found to contain about three pints of bees; and as 2000 bees are contained in a pint, this estimate of 6000 is as nearly accurate as possible.

Breeding commences in the month of January, and we should find on examination that the space of comb occupied by brood at that season will be about six inches in width and four inches in depth, giving a superficial surface of twenty-four square inches.

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Now brood is always present on opposite sides of the same comb in the regular seat of breeding in a hive (in glasses and at the sides of the hive in the heat of summer this is not uniformly the case); we therefore multiply the twenty-four by two, giving forty-eight square inches of brood in January.

If a piece of brood comb containing worker cells be measured, it will be found that on an average twenty-seven cells are contained in a square inch;* thus we have 1296 cells containing brood in the month of January. In February this breeding surface will have been extended to three combs, the centre one having a larger surface occupied than in the preceding month, and the comb on each side of the centre one having about the same quantity in February as the centre one had in January. This gradual progression extends until the month of June, when the greatest number of cells will be found to be occupied with brood.

Subjoined is a table showing the number of combs used in each month for breeding purposes, the number of cells in each comb, and therefore the number of bees reared during the eight months from January to August inclusive. The actual time required for a worker bee to arrive at maturity is twenty-one days. In the table we have calculated each cell to produce one bee during the month; but in fact there is an excess of nine or ten days in each month. This may be allowed for the cells which are occasionally missed by the queen in depositing eggs,—for inequalities in the shape of the space occupied by brood comb (our calculation of space in each case being a regular parallelogram),—for the time which elapses between the young bee emerging from the cell and its being again used,—and for the interregnum occurring between the time of the departure of the old queen with the swarm, and the establishment of the young queen in the monarchy of the hive, during which period no eggs are laid. These deductions for all practical purposes will render the calculation of one bee per cell per month as nearly accurate in its result as possible. We have presumed that the stock forming the subject of our calculation in the table swarms in the middle of June; if it does not swarm, the number of cells occupied with brood in July will

* A piece of comb 4 inches square will be found to contain 22 rows of cells of 19½ cells in each row. A piece 3 inches square will contain 17 rows of 14½ in each row. The average of the calculation on these data will give 27 cells to the square inch as nearly as possible.

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somewhat exceed the number stated in the table; in other respects it will not differ.*

Month.	Number and Disposition of Combs occupied by Brood, each Comb having two Surfaces in use.	Space occupied in each Comb, expressed in Inches.		Superficial Area of the two Sides of each Comb in Square Inches.	Total Breeding Surface of each Month.	Total Quantity of Bees hatched in each Month.
		Width.	Depth.			
JANUARY ..	One	6	4	48	48	1,296
FEBRUARY	One	4	4	32	112	3,024
	One	6	4	48		
	One	4	4	32		
MARCH ..	One	6	4	48	192	5,184
	One	8	6	96		
	One	6	4	48		
APRIL....	One	8	6	96	288	7,776
	One	8	6	96		
	One	8	6	96		
MAY	One	6	4	48	384	10,368
	One	8	6	96		
	One	8	6	96		
	One	8	6	96		
	One	6	4	48		
JUNE	One	8	6	96	480	12,960
	One	8	6	96		
	One	8	6	96		
	One	8	6	96		
	One	8	6	96		
JULY	One	8	6	96	288	7,776
	One	8	6	96		
	One	8	6	96		
AUGUST ..	One	8	6	96	192	5,184
	One	8	6	96		
					Total ..	53,568

Taking this table as our guide, we shall find that the number of bees bred from January to the middle of June (the usual period of swarming in the district of the writer of this essay) amounts to 34,128; add to this the 6000 bees existing in January,† and we

* In this table the centre comb of those bracketed together in each month is supposed to represent the centre comb of the hive, and the disposition of the other combs will also be as in the table.

† This addition is for the purpose of calculating the total number of bees dying; we shall hereafter see that not one of these bees was alive at this time.

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have 40,128 as the population in the middle of June. Let the stock now throw off a swarm of 20,000 bees; this reduces the number to 20,128. We now add the remainder of the bees bred in the month of June, which raises our number to 26,608; let a cast now be thrown off, which sometimes will nearly equal in bulk the swarm—take the quantity of bees at 12,000—which reduces our population to 14,608. We now add the bees produced in July and August, bringing our numbers up again to 27,568, as the total quantity of bees existing in the hive on the 1st September. Breeding may be prolonged a short time subsequently to this date; but the number produced is small, and of no importance to the discussion of our subject.

Now every observant apiarian will be aware that on the 1st September in any season, he will not have 27,568 bees existing in a stock, even if it happens to be exceedingly strong and has not swarmed; but according to our calculation that number ought to be existing, and forming the population of the hive. We must, therefore inquire how and to what amount their numbers have been reduced. The answer is, partly by accident, partly by enemies, such as birds, spiders, &c., and partly by natural death, the numbers have been brought down to something like 12,000; so that by taking the census of the original stock, we find a loss, and we have to account for the disappearance of 15,568 bees in the course of eight months.

It cannot, it is true, be said that all these bees die a natural death; the enemies and casualties to which the worker bees are exposed are so numerous, that the deaths arising from these causes must evidently form a large proportion; but at the same time it must be conceded that natural death has been the great agent at work to cause the disappearance of so large a number as 15,568 from one stock in so short a time, and we shall therefore be justified in assigning the limit to the duration of life in the worker bee to the period answering to the general result of our calculation.

Now if we add the 32,000 bees which departed with the swarm and cast from the hive, we have a total of 47,568, and we find that this number will absorb all the bees produced in the hive to the end of June and a few days further, and including therein the 6,000 bees existing on the 1st January;* it follows, therefore,

* Bees produced to the end of the month of June, see table, p. 159 .. 40,608
Bees existing in January 6,000
46,608

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that no bee living in the hive on the 1st January can have survived later than the 1st September, except it is existing either in the swarm or the cast; this, therefore, fixes the maximum duration of life in the worker bee at eight months at this period of the year (we use the expression "at this period of the year," because we shall presently see that the duration of life in the worker bee is not uniform).

Let us further examine how far our figures carry us out in the remainder of the year. On reference again to our table, we shall find that 12,960 bees are produced subsequently to the 1st July; and as it would seem from our last calculation that all the bees produced previously to the 1st July are absorbed in the number missing on the 1st September, it follows that these 12,960 bees will form the population with which our stock is to brave the dangers of the winter season, and from natural death and other causes it will even be reduced to 6,000 or 8,000 by the succeeding January, thus bringing us again to our starting point: taking eight months as the maximum of the life of the worker bee, the whole of these 12,960 bees will die by the 1st May, and as a large proportion of these bees will be eight months old on the 1st April, previously to which time but a small number of bees will have been produced to supply their loss, the month of March may well be termed a critical period for a stock of bees, simply for the reason that if the breeding has not been carried on with sufficient vigour to replace the bees dying off at this time of the year, so great a diminution in the number will take place that the stock will be in danger of death on that account; and even if it survive it will not be until the weather becomes mild and genial in May and June, that the stock will be able in any way to recruit its strength. Loss of stocks at this season of the year need not therefore surprise us.

Although we have demonstrated that the life of the worker bee does not exceed eight months, yet we have not shown that it reaches that period; and although we can assert as a fact, that of the 6,000 bees existing on the 1st January all were dead on the 1st September, yet we have not ascertained the time of their deaths, and as those bees were some of them six and some four months old when we commenced our investigation (having been produced between the 1st July and the 1st September in the preceding year), we must inquire when they die, in order to state their age. Now we find that 4,320 bees are produced in the months of January and February, and as a matter of course these young bees will form a great proportion of the population

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of the hive at that season, yet the population will exceed that number, consequently some of the bees in the hive on the 1st September in the previous year must be still alive; if we repeat this calculation on the 1st April we shall again find (making allowance for the loss of some of the bees produced since January by accidents, enemies, &c.) that the population again exceeds the number of young bees, thus showing that some of the 6,000 bees have still survived. If we take the census of the hive on the 1st May, we shall find that 17,280 bees have been bred since the 1st January, and this number (even after deducting for losses by enemies, bees lost in the showers of April and other causes) will exceed the whole population of the hive at that period; consequently we arrive at the fact that all the bees living on the 1st September in the previous year are dead prior to the 1st May in the next year, thus confirming our previous calculation that eight months is the maximum period of life; and we have also seen that, though all the bees are dead at the end of eight months, yet that some have lived longer than seven months.

The portion of the year comprised between the 1st September in one year, and the 1st May in the succeeding year, being that in which the life of the bee is passed in the most quiet state, in the depth of winter even approaching torpidity, and consequently the wear and tear of the muscular as well as the nervous system of the insect is least, it is fair to suppose that the duration of life is the longest, and that therefore eight months is in truth the maximum duration of life in the worker bee.

We ought now to inquire into the minimum duration of life:—we have plainly shown that all the bees produced previously to the 1st of July are dead or gone by the 1st September, a period of two months; and as this is the season when the vigour of the worker bee is called into the greatest activity, when the muscular system of the insect is taxed to the utmost, when the nervous system is subject to the greatest excitement, and when in fact night or day there is scarcely a moment's rest, it is reasonable to assert that the frame of the insect is sooner worn out, and therefore that the duration of life is shortened to the minimum period of two months. It will as a natural result follow, that the limit of life will vary from two to eight months, according as the powers of the insect have been taxed, so that those bees produced in January may survive six months, February a shorter period, March a shorter period still, down to the minimum of two months.

The non-uniformity in the duration of life in the honey bee is not a singular instance in Entomology; in all double brooded

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Insects the duration of life in the same species at different periods of the year is unequal;* and when a palpable reason can be adduced why the frame of an insect should be sooner worn out at one period of the year than another, it will be a justification to our assigning a shorter period to the life of the worker bee at that particular season, more especially when the various calculations we have followed out lead us to the same result; and we may remark, that some months of the winter season, the period of the longest duration of life in the bee, is passed in a state of quiescence nearly approaching that of the chrysalis of the double brooded insects.

We must now turn our attention to the 20,000 bees composing the swarm thrown off in the middle of June, and follow up the calculation with respect to them. Now these bees we have heretofore seen were all young bees of that year, as we proved that none of the 6,000 bees existing in January had lived beyond the 1st May, and the swarm does not depart until June.

On the 1st September we shall find that the population of this swarm does not reach 20,000, nor nearly so; we shall also find that the old queen, after establishing this new stock, will have produced above 12,000 brood, and as this number (12,000) does not exceed the actual population of the hive at the period of which we are now speaking, it follows that the whole number of bees leaving the stock hive as a swarm have died, and their place supplied with young bees.

If the same test is applied to the cast, the same result will follow, so that this is confirmatory of our assertion in the former part of this essay, that all the bees produced previously to the 1st July have died prior to the 1st September.

We are now able to appreciate the advantage possessed by a stock of bees which has not swarmed, in point of working numbers, over one which has swarmed.

The loss sustained by the hive swarming is that of 20,000 bees ready for work, and ready to take advantage of the season in gathering and storing honey. If these bees were to remain, and the season proves favourable, the whole of the honey gathered by them will be surplus store, and will amount to a large quantity; if they depart as a swarm, but just sufficient bees are left to carry on the ordinary operations of the hive, no surplus honey store will be produced. The departure of a swarm, therefore, is a serious loss in an economical point of view to the stock from

* The swallow-tailed butterfly is a familiar example.

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which it departs, and to the bee keeper it entirely destroys his prospect of obtaining honey from the stock, except he is bent upon its total destruction to obtain the little store they have, Surplus honey, unless the swarm rises very early in the year, and the season is very favourable, is quite out of the question.

It may appear strange, yet it is not more strange than true, that the 20,000 bees composing the swarm, after toiling to increase the store, do not help to consume it, but die, leaving the produce of their labours to support the life of their successors for the long period which is to elapse before the store can be replenished. What provision, then, is made to obviate the danger of absolute loss of the stock, whether in the hive or in the swarm, from the death of the 20,000 bees? We answer, if the parent hive has not swarmed, the numbers are kept up from eggs laid by the old queen; if it has swarmed, the numbers in the swarm are kept up by the old queen, and in the parent stock her place is supplied by a young queen, who, although she does not immediately commence laying eggs on the departure of the swarm, yet does so sufficiently early to produce brood to replenish the stock, so as to withstand the vicissitudes of the winter.*

This brings us to consider whether a double swarm, or, more properly speaking, the bees of two swarms joining in one, is advantageous or not. When a number of hives are kept near each other, two swarms, and sometimes three, will settle together; and although it may at first sight appear extremely advantageous to have so large a quantity of bees in a swarm, yet, when we reflect upon the fact that the whole number, large though it be, will die previously to the autumn, we must concede that the advantage in point of numbers continues for only that one season. It is true the vast number of matured workers will be enabled more speedily to build the necessary combs to establish the swarm, and the apiarian may without risk give the swarm extra space for surplus honey, whereby he may reap a present profit by taking honey from a swarm the first season; whereas, had it not been a double swarm, it would scarcely have been possible to do so without the risk of impoverishing the hive. Here the advantage ends, for notwithstanding two queens would rise with the double swarm, only one would be allowed to live; and the number of bees produced in the hive by the queen governing this double swarm,

* 1852 Aug. 5 Counted 4,090 cells of brood sealed over in observatory hive.
N. B. These same cells, to the extent of about two-thirds, were afterwards occupied by a second batch.
„ Aug. 19 Second course of brood beginning to be sealed over.

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would not be larger than if she were the monarch of only a single swarm; in the autumn the population would not be greater, and therefore the benefit ceases with that season. Far greater advantages result from the union of stocks in the autumn, a subject we shall notice in a subsequent part of this essay.

We conclude this portion of our essay with one more observation respecting swarming, viz., that at the time a swarm is thrown off, the greatest number of cells are occupied by brood, and by the time they are hatched off, a young queen will be ready to deposit eggs and continue the breeding, so that swarming does not in any great degree alter the total numbers actually produced in a stock during the year, whether it swarms or not: the young queen, though she does not begin to lay eggs immediately on the departure of a swarm, continues to lay later in the season than the old queen, so that the brood produced is thereabouts equal in both cases: the reduction in the number of matured workers by the emigration of the swarm and cast is nevertheless a serious consideration with respect to the quantity of surplus honey which may be expected from the stock.

Having successively treated of the age or duration of life of the queen, drone and worker bee, and having pursued at length the arguments supporting our views on the subject, at the same time noticing the observations on which our arguments are grounded, we now proceed to the consideration of the practical question, whether it is more expedient to retain swarms when it may be necessary to reduce the number of hives in an apiary, and destroy old stocks, or vice versâ.

In speaking of stocks, we must be understood to include hives in their second season, and upwards.

It must be obvious that we are in a great measure prepared to enter upon the discussion of this subject from the consideration of the various circumstances brought to bear in elucidating the duration of life in the bee, more especially that of the queen bee; and notwithstanding the strength of a stock of bees may be greatly dependant upon the number of workers, yet the future well-being of the stock must mainly be owing to the age, health and fecundity of the queen, and in this latter particular the queen is again dependant upon numbers, in order as it were to bring into play her extraordinary multiplying powers: the state of the queen therefore must particularly be considered in coming to a decision on this point.

We have seen that in respect to population, the difference between a swarm and a stock at the usual period of taking up hives

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is pretty nearly the same, and that the number of young bees in each case will also be nearly the same, so far therefore the balance is equal; but there are many other circumstances tending to show that the first winter of a swarm is a critical period, and on that account, it is preferable to retain stocks of one year old or upwards, instead of swarms, when it is *absolutely necessary* to reduce the number of hives in an apiary.

We now set forth the advantages possessed by stocks, and the disadvantages attending swarms, in parallel columns.

Disadvantages attending the retention of Swarms.	*Comparative advantages possessed by a Stock.*
The hive peopled by a swarm may very probably not be entirely filled with comb; if so, the open space will render it much more cold and uncomfortable than if the whole interior were filled with comb, and the bees will be more liable to be chilled when they begin to traverse the comb in the spring.	In the second season, when the swarm becomes a stock, the hive will be filled entirely with comb.
A swarm may in truth have a greater weight of honey than a stock, yet it may not have a sufficient quantity of pollen, or bee bread to consume, before the advance of the spring will enable the supply to be renewed.	A stock will always be plentifully supplied with pollen, and generally with honey: although it sometimes occurs, it seldom happens, that an old stock dies of actual starvation.
The queen will certainly be one year old; she may be two, and even three, and therefore so much nearer the time of her natural death, rendering the hive liable in a succeeding year or two, to the danger and risk attending her renewal; and being an old queen, she does not continue the breeding so	The old queen having departed with the swarm, the queen now governing will be a young queen of that year, and this most important advantage is possessed by the stock in consequence, viz., that the breeding by the young queen being carried on later in the season than by an old one, and

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Disadvantages attending the retention of Swarms.

late in the season as a young one.*

Comparative advantages possessed by a Stock.

let us suppose that even 500 or 1000 bees are produced after the 1st of September, their thread of life will not be run out so early in the succeeding spring, and it must be apparent that the aid and assistance of these 500 or 1000 bees for a fortnight or three weeks, at the critical time pointed out in our discussion of the age of the worker bee, will be of paramount importance in ensuring the future strength of the stock, as it is almost a maxim in bee economy, that a strong hive at that particular time will become stronger, whilst a weak one will become weaker.

Against the advantages thus possessed by a stock over a swarm, we must not lose sight of the disadvantage in a stock arising from the cells having become so contracted with the cocoons left by the bees after continuous breeding, as to be rendered unfit for use; but as this will only happen in a stock much advanced in years (more than five or six), the preponderating advantages possessed by a stock of two or three years over a swarm are so great that we may safely conclude to give the most earnest advice to select stocks for stores instead of swarms; even the single disadvantage attached to a stock, alluded to above, may be obviated, if the hive is so constructed as to allow the combs being readily cut out at the proper season of the year, to enable the bees to renew them.

We have already seen that a double swarm is in reality not of much permanent service to the apiarian, but a few moments' reflection will convince us that the case is very different with the autumnal union of the bees then composing stocks or swarms;

* In the observatory hive the young queen was laying eggs in the second week in September, though very slowly.

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and as we admit occasionally an absolute necessity may occur for reducing the number of stocks (the idea of *murdering* the bees ought to be completely banished from the mind of the apiarian), and when reasons can be shown why a union is really an advantage, it is hoped that the brimstone match may speedily become a mere matter of history. Referring therefore to the portion of our essay treating on the worker bee, we may perceive that if the union is delayed until after the 1st September, or it would be safer to say until towards the end of that month, all the bees then in the hive would be bees which would survive the winter; and if the bees of the swarm are added to those of the stock it will have the effect of doubling the population of the hive during the whole of the winter season. The consequence will be, that the increased heat of the hive will sooner induce the queen to deposit eggs; and a perusal of the preceding pages of this essay will carry conviction as to the benefit a stock of bees will receive from the renewal of the population of the hive being commenced earlier, or carried on with more vigour in the spring of the year than under ordinary circumstances: if instead of 3024 bees being produced in February, 5000 were produced, and a corresponding increase were also to take place in the numbers produced in the succeeding months until the time of swarming, the advantages must be palpable, and all owing to the surplus population obtained from autumnal union of stocks and swarms.

In thus as it were parading the advantages of autumnal union, we must not be understood to advocate the system generally, but only that it may be practised in cases of necessity. The operation of fumigation necessary to complete the union is a very delicate one, and requires to be performed with extraordinary care to be successful; in the practice of it we have found nothing to interfere with the operation so much as the sticks usually placed across the ordinary straw hives by cottagers; these sticks create so much difficulty in extracting the combs, that we have several times declined to operate for our friends solely on that account, being desirous that we should not personally be blamed for the failure of an experiment arising from impediments which we could not remove.

By a little management and foresight the union of stocks and swarms, we will not say *destruction*, may be prevented; and as prevention is better than cure, we will, even at the risk of being charged with prolonging the essay to an immoderate length, devote a few lines to this important question. In the swarming season let the apiarian consider well and determine his intentions

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and wishes respecting the future number of his stocks. In case he does not wish to increase the number of his stocks, when a swarm rises let it be returned; then let him watch carefully the proceedings of the hive or stock for the next nine or ten days. If young queens are brought out dead, exceeding three or four, he may be quite certain the stock will not cast; if the stock commences honey gathering with energy he may also rest satisfied that it will not cast. Should however the bees be determined to follow their natural course, and cast, they must be returned again and again until the whole of the young queens are disposed of, when the stock will quietly settle down, and the apiarian may look forward to his honey harvest. He will by this means have the increase of his stocks entirely at command; he will have the benefit of the labours of his surplus population; and if quality and fineness of honey is his aim, he can by no other means secure his object so certainly and safely as by returning his swarms, because in a stock when the swarm has been returned, no fear need be entertained of the queen depositing eggs in the glasses or boxes intended for surplus honey, and therefore extreme purity of the honey as well as whiteness of the comb it attained.

This process of returning is an exceedingly simple one, and certain of success: the bees are hived in an ordinary straw hive, and when they are settled (probably about twenty minutes after being taken), they should be dashed out on a white cloth by suddenly striking the hive mouth downwards on the cloth—the sharper the stroke the better; the hive should immediately be lifted up, and the bees will be seen in a confused lump on the cloth; *they will not rise or take wing*, but will spread themselves on the cloth. The queen must now be watched for diligently; when seen, she should be covered with a wine-glass, then slip under the glass a card or a piece of zinc, and care taken that she does not escape: she must be removed and killed. The bees may then be left to themselves, and they will, when they miss the queen, take wing and return to the stock whence they issued; but what is better, the cloth may be taken up by the corners, laid on a board sloping towards the mouth of the hive, and a communication made between the bees of the swarm and the stock: as soon as this is done, the bees of the swarm will be as anxious to return as they were to come out of the hive, and the operation will be complete in less than half an hour.

There is no danger in the operation whatever; we have performed it scores of times without covering of any kind, and with-

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out being once stung in completing it, and we are quite sure that any apiarian who has once seen the experiment carried out, and has noted the advantage to be derived therefrom, will be certain to adopt it. Plain practical directions may be given for performing the operation, but our strong advice to every one is, not to omit seeing it done by an experienced apiarian, if possible; more may be learned and more confidence gained in seeing once, than in reading a dozen times. We have practised this system entirely for the last six years, and during that time have never had occasion once to resort to any expedient to reduce the stocks in our apiary: the extract from "my note book," of the year 1847, given at pp. 153 and 154, will show how far the increase of stocks was prevented in that year; from the number of queens killed, the probability is, that had not the system been persevered in, the stock No. 4 would have been split up into numerous colonies, and forty pounds of *honey in glass* would certainly not then have been obtained.

We cannot better conclude this essay than by suggesting an experiment which occurred to us in the year 1851, but from the extraordinary circumstance of our not having a single swarm in our apiary in 1852 it was impossible for us to carry out; and in thus making it known, we may probably induce some of our apiarian friends to try the plan, and thereby it may the sooner be established as successful, or not, and the benefit, if successful, may be the sooner promulgated; in doing this, we feel we are not overstepping the bounds of this essay, inasmuch as the experiment bears practically on the prevention of the increase of stocks. In the year 1851, by accident, the bees of a swarm were returned to a hive to which they did not originally belong; that hive had been previously not much inclined to work (it is true, the population was not over large); immediately the bees of the swarm had joined this hive, the whole population commenced working vigorously, and produced in the season a fair proportion of honey; the stock from whence the swarm issued was a strong one, and although it did not produce as much honey as it would have done had the bees of the swarm been returned to it, yet it gathered strength and produced three glasses of honey, one being thirteen pounds in weight.

Now it occurred to us, that as the accession of the quantity of strange bees to the lazy hive immediately induced work, that it would be prudent, instead of returning the bees of a swarm to the stock from whence the swarm issued, to join them to another

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hive (if the queen be taken away, any hive will readily receive them); and the next swarm which issued from any other hive might be joined to the first hive which had thus lost its swarm, and so on, keeping up a continuous change of the quarters of the bees when they swarm.

We have always observed, that, after returning a swarm to the stock to which it originally belonged, such stock does not generally set to work steadily until after the lapse of four or five days; and we argue the reason to be this,—when the bees are returned, they find their own hive in precisely the same state as when they left it, and there is therefore no inducement to work, in fact the bees are disappointed; but if these bees are joined to a hive where a different state of things exists, then that they are instigated to pursue their natural labours and gather honey. This is merely the idea of the writer; but the accidental experiment having succeeded so well, he has ventured to mention it, at the same time explaining that he has not yet had the opportunity of testing its invariable success.

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XXI. *Descriptions of New Genera and Species of* Curculionides. *By* G. R. Waterhouse, Esq., F. Z. S.

[Read 7th February, 1853.]

Oxyrhynchus Fortunei.

Oblongo-ovatus, pulvere cervino tectus; thorace remote punctato, albo-tri-lineato; elytris seriatim ocellato-punctatis, interstitiis alternis elevatis, singulis linea alba ab humero ad medium suturæ ducta, notatis.

Long. corp., rostro excluso, lin. 7; latitudo lin. $2\frac{3}{4}$: ♂, long. $5\frac{3}{4}$; lat. $2\frac{1}{4}$.

Patria, China Boreali.

Considerably larger, and proportionately broader, than *O. discors;* the dilated basal portion of the rostrum broader and shorter; the puncturing both on thorax and elytra less distinct, the punctures being smaller and more remote; the interstices of the striæ of the elytra broader, and the alternate interstices very distinctly raised, and subcarinated. The ridges formed by the fourth and sixth interstices are united at some distance from the apex of the elytra; the suture, on the hinder half, is also raised, and from the apex there is a short ridge which runs obliquely forwards and slightly outwards to meet the second interstitial ridge. A series of very minute tubercles, each bearing a single pointed scale at its summit, is seen on each of the ridges mentioned. The general colour is sometimes ashy, sometimes very pale rufous brown. The middle pale band on the thorax does not extend quite to the base. On the forehead is a small fovea, and on the basal portion of the rostrum is a longitudinally-impressed line; in front of this the rostrum is keeled; in the female the keel is very short, but in the male it reaches about half way to the apex of the rostrum: here the rostrum is rather shorter than in the female, and strongly punctured; the scales extend beyond the point of insertion of the antenna, whilst in the female scales extend only to the points mentioned, and the fore part of the rostrum is nearly smooth.

Several specimens of this insect were brought from North China by Mr. Fortune, so well known for his travels and researches in that quarter of the globe. It is after this gentleman that I have named the insect.

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Oxyrhynchus Philippinensis.

Elongatus, niger, pulvere grisea tectus; rostro basi canaliculato; antennis longioribus, articulo tertio longiusculo, obconico; thorace elongato, lateribus postice rectis, antice rotundato-attenuato, supra rude punctato, pallide tri-lineato; elytra breviora, basi utrinque prope scutellum elevato-producta, in medio dentata, supra profunde punctato-striata, punctis subquadratis, interstitiis angustis, linea laterali, cruce obliqua, scutelloque, pallide squamosis.

Long. corp., rostr. excl., lin. 6⅔; lat. lin. 2½.
Patria, Insulæ Philippinenses.

Much larger and broader than *O. discors;* thorax proportionately longer, and the elytra shorter; antennæ longer, the third joint more distinctly longer than the rest, than in other species. The specimen from which this description is taken is discoloured, having been preserved in spirits; but the markings may still be traced. They resemble those of *O. discors;* but the three pale bands on the thorax are broader. The mesial longitudinal band is somewhat impressed. The bands on the elytra are also broader, and there is a broad undefined pale band across the base of the elytra. The sides of the thorax are quite parallel from the base beyond the middle; they are then contracted gradually, with a gentle curve, to the apex. The elytra, which are shorter than in other species, are depressed in the region of the scutellum; and on each side of this depression, the anterior margin is much produced in the form of a lobe, which is directed forwards and upwards, and leaves a cavity beneath; external to this lobe is a tolerably deep notch, and this is followed by an angular tooth-like process, which is placed nearly in the middle of the base of the elytron. The punctures of the striæ are rather larger and more approximated than in *O. discors*, being separated from each other by narrow transverse ridges. The legs are rather longer, and the tibiæ more curved than in the last-mentioned insect.

The peculiar form of the basal portion of the elytra is, in all probability, sexual, as in other species of *Oxyrhynchus* there are sexual differences noticed in the part in question.

TETRALOPHUS,* nov. gen. ENTIMIDÆ.

Antennæ breviusculæ, crassiusculæ, scapo brevi oculos non attingente; funiculo 6-articulato, articulis brevibus, sub-tur-

* From τέτρα, four, and λόφα, crest.

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binatis, clava breviter ovata. *Rostrum* crassum, supra bicristatum, apice infra incrassatum; scrobs obliqua antice profunda. *Caput* immersum; fronte utrinque depressa; *Oculi* ovati, sub-depressi. *Thorax* transversus, utrinque angulatim productus, apice utrinque emarginatus, pone oculos lobatus, postice sub-truncatus, dorso bicristatus. *Scutellum* nullum. *Elytra* oblonga, humeris antrorsum et extrorsum productis, lateribus sub-parallelis, apice rotundata, singulis apice breviter mucronatis. *Pedes* tenues; tarsis longis, subtus haud spongiosis. *Corpus* oblongum, valde inæquale, glabrum, apterum, majusculæ magnitudinis.

Tetralophus sculpturatus.

Oblongus, niger, rostro supra bicristato, medio sulcato; capite postice subtiliter rugoso, fronte bifoveata, medio breviter carinata; thorace supra alte bicristato; lateribus angulatim productis, antice obliquis, postice emarginatis; elytris seriatim et profunde punctatis, singulatim bi-seriatim tuberculatis; tuberculis plerumque validis acutis.

Long. corp., rostr. excl., lin. $5\frac{3}{4}$; lat. lin. $2\frac{1}{4}$.

Patria, Nova Hollandia.

Rostrum short and incrassated, very deep at the apex, with two longitudinal crests above, which are distinctly punctured, and separated by a deep groove; the apex with a triangular plate, deeply indented in the middle, and with apex joining a short middle ridge behind. Head very finely rugose; forehead with two deep depressions, separated by a small narrow ridge. Thorax broader than long, with a transverse indentation near the apex; the sides produced in the middle into a horizontally compressed process, which is truncated externally, rounded in front, and emarginated, and presents an acute angle posteriorly; the dorsal surface with two longitudinal crests, which diverge somewhat in the middle (where they are much elevated) and are indented near the fore part, and have two or three transverse indentions on the hinder part; the summits of these crests (as well as those on the rostrum) are distinctly punctured; the surface, on either side and between them, presents a few rugæ, but is impunctate. Elytra oblong, about equal in width to the thorax, the sides nearly straight, parallel, and perpendicular, and the apical portion much bent down; dorsal surface of each elytron with two rows of tubercles, of which the outer row is the longer; the foremost tubercle of this series is very large, and somewhat compressed

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and sub-acute: it is produced outwards and forwards; the terminal tubercle of the same series is also very large, and it is acutely pointed; between the two, are from three to five* smaller (though still tolerably large) pointed tubercles. The hindermost tubercle of the inner row is situated at about the commencement of the posterior third of the elytra, and is tolerably large; the remaining tubercles of this series (five in number) successively decrease in size. Three rows of strong punctures are seen on the sides of the elytra, and a row of smaller punctures runs parallel with, and close to, the lateral margin. The legs are slender, and moderate as to length; the joints of the tarsi long and narrow, the penultimate joint not dilated; claws moderate, diverging and simple. The antennæ are clothed with small black hairs.

LEPTOSTETHUS,† nov. gen. PACHYRHYNCHIDÆ.

Antennæ breves, validiusculæ; scapo brevi, crasso, oculos non attingente; funiculo 7-articulato, articulo primo obconico, breviusculo, 2do brevissimo, obconico, reliquis subturbinatis; clava ovata, acuminata. *Rostrum* breve, latum. *Oculi* laterales rotundati, modice convexi. *Thorax* subtransversus, basi apiceque subtruncatus, lateribus æqualiter rotundato-ampliatus, supra paulo convexus, infra pone gulam emarginatus, pone oculos lobatus. *Scutellum* triangulare. *Elytra* elongata, basi truncata, elevato-marginata, apice conjunctim subattenuato-rotundata, ad suturam paulo producta. *Pedes* mediocres, validi, pilosi, antici paulo longiores, ad basin paulo distantes; femoribus in medio crassioribus; tibiæ intus denticulatæ. *Corpus* elongatum, modice convexum.

Type *L. marginatus.*

This genus is near *Polyphrades* in its characters; the general form is more elongated, the scape of the antennæ is proportionately stouter, and rather shorter, since it does not reach the eyes; the rostrum is not carinated, and the terminal portion is differently constructed; the tarsi are rather larger, and the anterior coxæ are separated. The generic name will serve to call attention to this last character, which distinguishes *Leptostethus* from other genera of *Pachyrhynchidæ*, to which family it undoubtedly belongs.

Leptostethus marginatus.

Elongatus, linearis; ater, femoribus ferrugineis; capite rostroque rugosis, irregulariter punctulatis; thorace confertim

* Three on one elytron and five on the other in the insect before me.

† From λεπτος, small, slender, and στηθος, the breast.

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granulato; elytris crenato-striatis; thorace elytrisque lateribus flavo-squamosis; pectore ventreque flavo-squamosis, nigro-maculatis.

Long. corp., rostr. excl., lin. $7\frac{3}{4}$; lat. lin. $2\frac{3}{4}$.

Patria, Africa meridionali occidentali.

Head very broad, convex, covered above with small shallow depressions, in each of which are minute punctures; the hinder part rugose. Rostrum rather narrower than the head, though still very broad, subquadrate, nearly flat above, with a shallow transverse depression at the base; and at the apex are two shallow, oblique depressions, leaving a triangular area between them, the base of the triangle being in front, and having a fovea in the middle; jaws short and stout; the whole upper surface rugose, and thickly punctulated. Thorax fully one-fourth broader than long, rather narrower in front than behind, the sides rounded, the upper surface but little convex, covered with small and but little raised tubercles; a dorsal furrow extends from the base nearly to the apex; the posterior margin slightly raised, and the posterior angles somewhat acute. Scutellum broadest at the base, contracted and elongated behind; thickly punctured. Elytra much elongated, about three times the length of the thorax, and about equal to that part in width; the sides nearly parallel, but towards the apex they are slightly attenuated, and at the apex rounded, with the sutural portion (which is here considerably raised) produced so as to form projecting angle; the base of the elytra is nearly straight, the margin raised, and the humeral angle slightly prominent, and somewhat acute; the punctures of the striæ are tolerably large, nearly square, and separated by transverse ridges; interstices slightly convex, and, under a strong lens, they appear to be nearly covered with minute round scales.* The sides of the thorax and elytra, the under part in front of and between the legs, the chest, and abdomen, are clothed with bright yellow scales, which have an undefined outline, and a dull velvet-like surface; the central portion of the abdominal segments, nearly the whole of the terminal segment, and the central portion of the chest, are denuded, and on the whole of the scaly parts are seen minute black punctures. The remaining parts are black and slightly glossy, if the femora be excepted, these being red; small

* It is rather remarkable that these minute particles, which certainly have all the appearance of scales, exhibit no colour, but are glossy black, like the elytra which they cover; if they be discoloured, how could the broad bright band on the sides of the elytra have escaped discolouration?

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pale hairs are scattered over the thighs, and longer pale hairs are seen in tolerable abundance on the tibiæ and tarsi; at the apex of the tibiæ they are very dense. The spongy substance on the underside of the tarsi is dusky brown on the two basal joints, and yellowish on the penultimate joint. The tibiæ are distinctly denticulated within. The claws are of moderate size, simple and diverging.

Leptostethus Waltoni.

Oblongus, niger, squamulis pallidis flavescentibus vestitus; femoribus rufis; rostro apice sub-gibboso, quadricarinato, basi rugoso, sub-canaliculato, transversim leviter impresso; thorace confertim nigro-granulato; elytris punctato-striatis, singulo ad apicem paulo producto, subacuto.

Long. corp., rost. excl., lin. 5; lat. lin. 2.

Patria, Africa meridionali-occidentalis.

This insect differs considerably from *Leptostethus marginatus*, and more particularly in the form and structure of the rostrum, a circumstance which at first caused me to hesitate in placing it in the same genus; after a minute examination, however, I found so many points in common, that I was led to believe that the two insects will probably hereafter be found to constitute species of different sections, possibly of a tolerable extensive genus, and peculiar perhaps to the as yet little known south-western portions of Africa. Whereas *L. marginatus* is remarkable for its very broad, nearly quadrate rostrum, the upper surface of which is nearly flat, the present insect has a rostrum very like that of *Polyphrades* in its proportions; it differs, moreover, in being somewhat humped between the points of insertion of the antennæ; and anterior to the hump the rostrum is bent down so as to form an obtuse angle with the hinder part. This anterior portion of the rostrum is of a pitchy brown colour, finely punctured, and has three oblong depressions, which are bounded and separated by ridges. The hinder part of the rostrum is somewhat convex in the transverse direction; is separated from the head by a shallow transverse depression; punctured; has a slight groove in the middle at the base, and several indistinct longitudinal rugæ. The head (very like that of a *Polyphrades*) is rugosely punctured. Thorax considerably broader than long, with the sides rounded, the fore part rather narrower than the hinder part; the posterior angles in the form of right angles; the fore part emarginated above and below; the upper surface covered with small subdepressed granules, between which are pale dirty yellowish scales,

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and in the middle is a longitudinal groove. On the lower part of the sides of the thorax the scales are more dense, and of a more decided yellow colour. Scutellum transverse; elytra at the base equal in width to the part of the thorax which they join, they then swell out very gradually, and assume an elongate oval form; each elytron is slightly produced at the apex; the upper surface is moderately convex; the punctures of the striæ remote, and of moderate size; interstices flat, or very nearly so, and very indistinctly setose: the third and fifth interstices are rather broader than the others. The tibiæ are but indistinctly denticulated within. The terminal segment of the abdomen is destitute of scales; the femora dusky at the apex. The anterior coxæ are separated as in *L. marginatus*.

I have named this species in honour of Mr. Walton, who has determined with so much care the British species of *Curculionides*.

ACHLAINOMUS,* nov. gen. PACHYRHYNCHIDÆ.

Antennæ mediocres, scapo oculos fere superante, clavato; articulis duobus basalibus funiculi longiusculis, obconicis, reliquis turbinatis; clava oblongo-ovali, acuminata. *Rostrum* breviusculum, apice paulo incrassatum, supra planum, canaliculatum; mandibulæ breves, crassæ, exsertæ. *Caput* paulo exsertum. *Oculi* rotundati, convexi. *Thorax* suborbiculatus, basi apiceque truncatus, ab elytris remotus; postice elevato-marginatus. *Scutellum* minutum. *Elytra* oblongo-ovata, basi constricta; humeris obliquis. *Pedes* mediocres, antici paulo longiores et robustiores; tibiis intus crenulatis, anticis valde curvatis, posticis apice interne laminato-productis; tarsis mediocribus, unguiculis parvulis, ad basin connexis. *Corpus* oblongum, parum convexum, glabrum, mediæ magnitudinis.

This genus I am inclined to place near to *Prostomus;* the form of the head is nearly the same as in that genus, but the eyes are less prominent, and rather more remote from the thorax; the rostrum has the same general proportions, but wants the two grooves and three longitudinal ridges; the antennal groove takes the same direction, and terminates at a little distance below the eye; the joints of the antennæ are rather shorter; the thorax presents nearly the same outline, but is rather less convex, as are also the elytra, which differ, moreover, in not having the humeral angle produced. The fore legs are longer than the rest; the anterior

* A priv., and χλαίνωμα, an outer garment.

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femora very stout: all the tibiæ are denticulated within, but the much curved anterior tibiæ have the denticulations unusually prominent, especially near the apex. The middle tibiæ are somewhat dilated externally, and internally at the apex, and the posterior tibiæ are much dilated at the extremity, on the outer side, as in *Prostomus*, but there is an inner produced portion which is larger than the outer. The tarsi are rather slender; the claws very small, and they appear to be united at the base, and at the other extremity they diverge very little.

Achlainomus ebeninus.

Oblongus, niger, nitidus, parum convexus; antennis articuloque ultimo tarsorum piceo-rufescentibus; capite rostroque punctulatis; rostro canaliculato; thorace crebre et subtilissime punctulato, in medio fere plano et canaliculato; elytris punctato-striatis, interstitiis coriaceis, postice pilis minutis fuscescentibus sat dense obsitis.

Long. corp., rostr. excl., lin. 4½; lat. lin. 1¾.

Patria, India Orientalis.

This insect is rather larger than *Psalidium maxillosum*; its form is more elongate, and much less convex, and in fact approaches nearly to that of *Prostomus scutellaris*. The thorax is equal in length and breadth, and has the sides equally rounded; it is slightly constricted close to the anterior margin, and there is a transverse depression near the hind margin. The elytra are truncated and constricted at the base; the humeral angles are very oblique, the sides in the middle portion nearly parallel, the apical portion gradually attenuated, and the apex obtusely rounded: on the fore part the elytra are subdepressed, but on the hinder part they are moderately convex. The under parts of the body are very thickly punctulated. The narrow and sharp denticles on the inner side of the anterior tibiæ are red,—if we except the smaller denticles near the base. The legs are pubescent. The constricted base to the elytra and thorax, and the two being somewhat separated, reminds of that form of the parts in question which is common in the *Scaritidæ*.

Enaptorhinus,* nov. gen. BRACHYDERIDÆ.

Antennæ mediocres, validiusculæ; scapo oculos vix attingente; articulis duobus basalibus funiculi obconicis, reliquis brevibus, subturbinatis; clava ovata, acuminata. *Rostrum* breve,

* From ἐνάπτω, to gird or bind; and ῥὶν, snout.

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crassum, capite angustius illoque paulo longius subangulatum, basi supra convexum, per strigam transversam a capite distinctum, apice emarginatum; scrobe profunda subito subtus flexa. *Caput* paulo exsertum, supra modice convexum. *Oculi* parvi, rotundati, convexi. *Thorax* oblongus, basi truncatus, apice supra paululum rotundato-productus, lateribus æqualiter rotundato-ampliatus, dorso parum convexus. *Scutellum* minutum. *Elytra* elongato-ovata, apice attenuata, *Pedes* longiusculi, pilosi; femoribus clavatis; tarsis mediocribus, articulo ultimo biunguiculato. *Corpus* elongatum, parce squamosum, mediocris magnitudinis. *Elytra* thorace parum latiora, dorso depressa; tibiæ posticæ pilis longissimis vestitæ.

The genus *Geotragus*, it appears to me, approaches most nearly in its characters to the insect upon which the present genus is founded. *Enaptorhinus* is of a more elongated form; the rostrum, instead of being depressed above, is somewhat convex; the pterygii (or side pieces at the apex, beneath the rostral groove) are more prominent, and there is a constriction at the base, separating the rostrum from the head; this transverse groove is somewhat curved, bending forwards in front of each eye; the antennal groove descends more suddenly: the antennæ are much stouter, and have the joints shorter, and there is scarcely any trace of crenulation on the inner side of the tibiæ.

Enaptorhinus Sinensis.

Elongatus, piceus, parce squamulosus; capite rostroque punctatis, sat dense fusco-cinereo squamosis; thorace rugoso, canaliculato, vittis tribus pallide squamosis, notato; elytris elongato-ovatis, dorso depressis, squamulis pallidis, ad latera densioribus, adspersis, punctisque duobus subapicalibus, albidis, notatis, punctato-striatis, interstitiis alternis lateralibus elevatis.

Long. corp., rostr. excl., lin. $4\frac{2}{3}$; lat. lin. $1\frac{1}{4}$: ♀ (?) long. lin. 5; lat. $1\frac{3}{4}$.

Patria, China borealis.

Amongst the *Coleoptera* brought from China by Mr. Fortune were several specimens of the insect here described, and the series consisted of individuals in which the elytra were very narrow, the whole dorsal surface of the elytra flat (or even slightly concave), and the hind tibiæ rather densely clothed with long pale hairs; and other specimens in which the elytra were more ovate, broader,

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and with the dorsal surface very slightly depressed; the hinder tibiæ rather shorter, and clothed with small hairs only, like the other legs. The specimens agreed so perfectly in all other respects, that I was convinced these differences were sexual, and I also conclude that the individuals with the broader elytra are the females. I will only further add that the slightly concave back to the elytra gives to the apical portion a somewhat humped appearance in the male, and that there are numerous longish stiff erect hairs on this humped part.

CUBICOSOMUS,* nov. gen. CLEONIDÆ.

Antennæ mediocres; scapo oculos vix attingente; articulis duobus basalibus funiculi longiusculis, obconicis, reliquis brevibus, sub-turbinatis; clava oblongo-ovata. *Rostrum* longitudine capitis cum thorace, angulatum, apice crassiusculum; scrobs obliqua. *Caput* angustum; fronte impressa, utrinque sub-gibbosa. *Oculi* oblongi, parum convexi. *Thorax* parvus, postice truncatus, antice profunde rotundato-emarginatus, pone oculis lobatus; lateribus fere rectis. *Scutellum* nullum. *Elytra* ampla, thoracis basi duplo latiora, sub-quadrata; humeris obliquis angulatis; apice valde declivi. *Pedes* mediocres; angulis parvulis.

Near *Leptops*, but differs in the general form; the rostrum being rather longer than in the species of that genus; the head narrow, the forehead depressed, but with an oblong, slightly raised gibbosity on either side over the eye, which latter is placed in a depression and has a raised orbit; the antennæ present but two elongate obconic joints to the funiculus, the remaining joints being turbinate; the thorax small; the elytra ample and nearly cuboid in form.

Cubicosomus Whitei.

Ater, sordide fusco-squamosus; rostro longitudinaliter impresso, basi obtuse carinato; fronte utrinque sub-gibbosa, medio depressa; capite postice rugulis minutissimis crebre obsito; thorace angusto, lateribus fere rectis, ante medium perpaulo latiore, supra valde inæquali, medio longitudinaliter impresso, pone medium transversim impresso; elytris inæqualibus, sub-seriatim profunde punctatis, interstitiis transversim rugosis, biseriatim obtuse tuberculatis.

Long. corp., rostr. excl., lin. 5½; lat. lin. 3½.

Hab. Nova Hollandia, apud "Richmond River."

The insect from which the above description is taken appears to

* From κυβικὸς, cubical, and σῶμα, body.

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have been originally covered throughout the upper parts with dirty brown scales, but these have been in a great measure rubbed off. Each of the rows of tubercles on the elytra consists of four large, nearly equal, rounded tubercles, the foremost being very near the base of the elytra, and the hindermost far removed from the apex; besides which there are two or three small tubercles near the apex, and there is a small tubercle on the anterior margin on either side at some distance from the scutellum. The transverse and longitudinal depressions on the thorax are bounded by large rugæ, and there are, moreover, a few large punctures and some small and slightly raised tubercles on the thorax. The rostrum has a longitudinal groove on each side, and a triangular elevated plate at the apex.

EURYCHIRUS, nov. gen. MOLYTIDÆ.

Antennæ breviusculæ, scapo clavato, oculos attingente; articulis duobus basalibus funiculi obconicis, reliquis brevibus, subrotundatis; clava elongato-ovata, acuminata. *Rostrum* breviusculum, capite vix longius, teres, versus apicem sensim crassius, supra leviter carinatum. *Oculi* magni, sub-rotundati, modice convexi, in fronte sub-approximati. *Thorax* basi apiceque truncatus, convexus, lateribus ante medium rotundatus, postice elevato-marginatus. *Scutellum* triangulare. *Elytra* ampla, humeris productis, obtuse angulatis. *Pedes* magni, longi, femoribus pone medium valde incrassatis; tibiæ apice muticæ; tarsis latis, articulo ultimo crassiusculo, biunguiculato. *Corpus* breve, modice convexum, squamosum, mediæ magnitudinis.

The rostrum in this genus is very like that of *Phytonomus*, and is a trifle longer in proportion and less thick than in *P. punctatus;* the head is rather more exserted, and hence the eyes are somewhat removed from the lateral margin of the thorax, which presents no trace of lateral lobe: excepting that the scape is rather less thickened, the antennæ are very nearly the same—they spring from the apex of the rostrum. The eyes are very large, for the most directed forwards, and encroach upon the forehead. The elytra differ in having the humeral portion more produced, oblique at first, then obtusely angular. The legs are remarkably large; the femora very long, and much incrassated: the tarsi are very large, the joints much expanded, and differing but little in width; the claw joint is very stout, and provided with moderate sized, diverging, simple claws.—I have no hesitation in placing this genus in the family *Molytides*, and near to *Hypera*.

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Eurychirus bituberculatus.

Breviter ovatus, niger, squamulis virescenti-cinereis, sub-metallicis, vestitus; antennis ferrugineis; rostro piceo, punctulato, leviter carinato, capite subtilissime punctulato; fronte fovea minuta impressa; thorace crebre punctulato; elytris ocellato-punctato-striatis, singulo tuberculo sat magno, fere in medio, tuberculoque minore subapicali instructo; interstitiis 5° et 7° elevatis; plagis punctisque nonnullis denudatis.

Long. corp., rostr. excl., lin. 4¼; lat. lin. 2⅔.

Hab. in Nova Hollandia.

PLACODERES,* nov. gen. CYCLOMIDÆ.

Antennæ longiusculæ, scapo clavato; funiculo 7-articulato, articulis omnibus obconicis, duobus basalibus longioribus; clava angusta, ovata, acuminata. *Rostrum* breve, crassum, carinatum, supra os plaga triangulari, elevata, medio depressa, munitum. *Caput* postice convexum, inter oculos fere planum. *Oculi* laterales, oblongi. *Thorax* transversus, basi apiceque subtruncatus, lateribus valde rotundato-sub-angulato-productus; supra fere planus, pone gulam rotundato-emarginatus. *Scutellum* vix observandum. *Elytra* a thorace remota, oblongo-ovata, convexa, basi truncata, humeris rotundatis; apice conjunctim rotundata. *Pedes* longiusculi, sub-æquales; tarsis sub-angustatis, subtus spongiosis. *Corpus* oblongo-ovatum, squamosum, majusculæ magnitudinis.

Nearly allied to *Acantholophus*, but differs in having the funiculus of the antennæ distinctly seven-jointed,—the terminal joint not being elongated and closely applied to the club as in that genus,—in the head being more produced, and without spines, the eyes being oblong; the thorax destitute of spines, much broader than long; the sides being much produced and almost forming an angle in the middle; the elytra being rather widely separated from the prothorax, and by the tarsi being broader: the joints of the latter are all of them very nearly equal in width, if we except the claw-joint, which is stout and furnished with diverging simple claws. The rostrum is about equal to the head in length, and is separated from the latter by two slight oblique grooves which meet at the forehead; the antennal groove is very deep in front and opens upwards; it expands and is very shallow towards the eye: the jaws are very stout.

* From πλαξ-ακὸς, a flat body, tablet, &c., and δειρὴ, the neck.

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Placoderes variegatus.

Elongatus, niger, squamulis minutissimis angustis flavescentibus fuscisque tectus; capite rugoso sub-coriaceo, linea longitudinali umbrino-squamosa notato; rostro tricarinato, basi supra utrinque oblique impresso; thorace lateribus valde productis in medio sub-angulato, supra fere plano sat crebre granulato, dorso leviter canaliculato; elytris remote punctato-striatis, interstitiis sat crebre granulatis, parum convexis, alternis paulo elevatioribus, nigro-variegatis.

Long. corp., rostr. excl., lin. $6\frac{3}{4}$; lat. lin. $2\frac{3}{4}$ ♂ ?: ♀ ? long. 9, lat. $3\frac{3}{8}$ lin.

Habitat ——?

I strongly suspect this is a New Holland insect,* but I had no habitat with it. In the smaller specimen, which I take to be the male, the thorax and elytra are about equal in width, and in the larger specimen the elytra are rather broader than the thorax. The under parts of the body are very sparingly clothed with scales, and are rather finely and irregularly punctured; on the abdominal segments (more especially the terminal segment) are a few very minute scattered granules. The scales along the mesial line of the thorax are rather paler than on other parts, if we except two small spots in the middle of each half. The scales of the elytra vary in tint, some being umber brown and others brownish yellow; they form small patches of either colour; and there are small irregular black markings in parts formed by dark scales, but on the sides of the body, where they are most distinct, they are seen to be denuded patches. The little rounded tubercles, or granules, both on the thorax and elytra, are denuded and glossy. The antennæ are clothed with black hairs—the scape as well as other parts; and so are the legs.

ECTEMNORHINUS,† nov. gen. PHYLLOBIDÆ.

Antennæ longiusculæ, scapo thorace attingente, clavato, basi inflexo; articulis duobus basalibus funiculi longiusculis, obconicis, reliquis brevibus, sub-turbinatis; clava ovata, acuminata. *Rostrum* capite brevius et vix angustius; scrobe brevissima, postice supra flexa. *Caput* pone oculos elongatum. *Oculi* laterales, breviter ovales, parum prominuli.

* M. Jekel, to whom I have shown this insect (since this paper was read), informs me he possesses a species very like, if not identical with it, from the Cape of Good Hope. It approaches very near to the genus *Somatodes*; indeed, M. Jekel had provisionally placed his insect in that genus: we both, however, think that it presents characters which render it desirable to form a new genus for its reception.

† From ἐκτέμνω, to cut out, notch, and ῥὶς, the rostrum.

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Thorax parvus, antice posticeque truncatus, lateribus parum rotundato-ampliatus. *Scutellum* triangulare. *Elytra* elongato-ovata, pone medium ampliata, humeris rotundatis, subangulatis, supra parum convexa, apice singulatim rotundata. *Pedes* mediocres; femoribus muticis.

This genus is near *Phyllobius* in its general characters; the head and thorax are proportionately smaller, the elytra more elongated, less convex, and each elytron is distinctly rounded at the apex; the rostrum is shorter and narrower, and the antennal groove is differently formed—it is represented by a small and short curved fovea placed towards the apex of the rostrum; the fore part of the fovea opens outwards, and the hinder part is curved inwards, and forms a notch on the upper surface of the rostrum, and the space between the notches entering from opposite sides of the rostrum is much contracted. On the upper surface of the terminal portion of the rostrum is a slightly raised plate, nearly of a quadrate form, the posterior angles of which extend partly over the antennal foveæ. The eyes are less prominent than in *Phyllobius*, and the claws are larger and less diverging. The antennæ scarcely differ.

Ectemnorhinus viridis.

Elongatus, piceus, supra squamulis piliformibus viridi-sericeis tectus; corpore subtus, antennis pedibusque piceo-rufis; fronte punctulata, foveolata; thorace leviter carinato; elytris tenuiter punctato-striatis.

Long. corp., rostr. excl., lin. $3\frac{3}{4}$; lat. lin. $1\frac{1}{2}$.

Patria, terra Kerguellen.

The outline of the head is continuous with that of the rostrum both above and at the sides, in the latter interrupted only by the eyes, which are of a short oval form, very little convex, and placed longitudinally. The thorax is very small in proportion to the elytra, about equal in length and breadth and nearly cylindrical, but with the middle part somewhat swollen. The elytra are ample, much elongated, about four times the length of the thorax, have the humeral angles prominent, almost in the form of right angles, the angle being slightly rounded off; they gradually increase in width till they have attained their maximum diameter, at a point considerably behind the middle, and then decrease again with a gentle convex curve towards the apex, where each elytron is rather obtusely rounded. The green scales which cover the upper parts have a silky, metallic lustre.

Specimens of this insect will be found in the collection of the British Museum. Of course, considerable interest attaches itself

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to the insects found in islands so far removed from any mainland, such as Kerguellen's land.

DREPANODERES,* nov. gen. PHYLLOBIDÆ.

Antennæ mediocres; scapo crassiusculo, paulo curvato; articulis duobus basalibus funiculi longiusculis obconicis, reliquis turbinatis; clava angusta, elongato-ovata, acuminata. *Rostrum* breve, sub-quadratum, supra carinatum. *Scrobs* brevis, recta. *Oculi* ovati, convexi. *Thorax* transversus, utrinque in spinam acutam, retrorsum curvatam, valde productus. *Scutellum* triangulare. *Elytra* oblongo-ovata, convexa. *Pedes* mediocres; femoribus dentatis. *Corpus* oblongo-ovatum, convexum, alatum, minoris magnitudinis.

The most striking peculiarity in this genus is in the form of the thorax, and has no parallel in the *Curculionides;* there are genera, such as *Deracanthus* and *Acanthotrachelus*, in which the thorax is armed with a lateral spine, but in *Drepanoderes* the side of the thorax is, as it were, itself produced into a large lateral process. Almost immediately in parting from the apex of the thorax, the outline runs obliquely outwards, and with a gentle curve is likewise directed backwards, to form the upper margin of the process in question; the outline of the under margin is concave, the point of the process is raised very little above the level of the base of the elytra, but terminates external to the line of the side, hence the thorax measured across from the points of the processes is broader than the elytra; the base of the thorax, however, is about one-third narrower than the elytra at the corresponding part; the humeral angles form right angles; the sides of the elytra are at first nearly parallel, but behind the middle they are slightly dilated; the apex is rounded. Besides the very slender central keel to the rostrum, there is a delicate longitudinal ridge on either side of the upper surface.

Drepanoderes viridifasciatus.

Oblongo-ovatus, niger, viridi-squamosus, antennis pedibusque rufis; capite postice nigro; thorace punctulato, fasciis tribus longitudinalibus atris notato; elytris atris punctato-striatis, fasciis quatuor, utrinque et in medio plus minusve interruptis, maculisque apicalibus, viridi-squamosis.

Long. corp. 2⅝ lin.

Patria, India Orientalis.

* From δρεπάνη, scythe, and δέρη, neck.

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The under parts in this insect are but imperfectly covered with scales; the head and rostrum are covered by them, if we except the slender mesial ridge of the latter, and a triangular patch on the former. Scales cover the sides of the thorax, but on the upper part there are three longitudinal denuded bands, of which the central one is very broad; the large recurved sub-sickle-shaped processes have but few scales on them. The punctures on the thorax are small, and rather widely separated. On the elytra the scales are so disposed as to form very irregular bands and spots; at the base is a broadish transverse band extending almost to the suture; behind this is a second band, which stops short of the suture; the third band is considerably shorter; the fourth is rather longer than the third; and lastly, on the hinder third of each elytron there are about six or seven spots varying in size; neither the bands nor the spots quite correspond in the two elytra, and they no doubt will be found to vary in different individuals. None of the bands extend to the outer sides of the elytra. Towards the apex of the femora are some scales; the tooth beneath is very small but acute; all the scales are of a brilliant metallic green colour.

The only specimen of this species which I have seen is in the collection of the British Museum, and is from Bengal.

Drepanoderes fuscus.

Oblongo-ovatus, fuscus; antennis pedibusque testaceis; capite punctulato, fronte foveolato; rostro leviter carinato; thorace crebre punctato; elytris punctato-striatis, interstitiis subconvexis, pilis minutis sat dense obsitis; femoribus subtus dente parvulo, acuto, armatis.

A trifle smaller than *D. viridisquamosus*, and readily distinguished by its colouring, the want of scales, and the thorax being more thickly punctured.

SYNAPTONYX,* nov. gen. ERIRHINIDÆ.

Antennæ mediocres, tenues, ante medium rostri insertæ; scapus clavatus, oculos non attingens; articulis duobus basalibus funiculi longiusculis, obconicis, reliquis obconicis, gradatim brevioribus; clava ovata. *Rostrum* longiusculum, ante medium deflexum, dimidio apicali sub-planum utrinque carinatum, postice sub-carinatum; scrobe sub-superna, postice

* From συναπτὸς, bound together, and ὄνυξ, claw.

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evanescens. *Oculi* laterales, oblongi, modice convexi. *Thorax* transversus, antice dimidio angustior quam basi, apice rotundato-emarginatus, infra pone gulam emarginatus, lateribus obliquis-rotundatis, basi rotundato-sub-productus; supra convexus. *Scutellum* minutissimum. *Elytra* ovata, basi conjunctim rotundato-emarginata, thoracis basi parum latiora, apice acuminata. *Pedes* mediocres; tarsi articulo primo latiore, unguiculis parvis, basi connatis, ad apicem vix divergentibus. *Corpus* breviter ovatum, convexum, squamosum, minoris magnitudinis.

The form of the insect upon which this genus is founded is almost a perfect oval, for the elytra at the base are but little broader than the thorax, and the outline of the two is nearly continuous. The rostrum is about equal to the head and thorax in length, and moderate as to thickness. The basal half is nearly straight; but the terminal half is bent down so as to form an obtuse angle, at least on the upper surface, and at this point is the base of the small antennal groove which here opens upwards; the remaining portion is continued backwards towards the eye, on the side, but close to the upper edge of the rostrum. It is very indistinct (excepting quite at the origin), filled with scales, and cannot serve to lodge the scape of the antennæ. Between the two oblong foveæ in which the antennæ are inserted is an elongated triangular plate, which has the apex slightly raised and directed towards the head. In front of this part the rostrum is acutely margined on each side; the upper surface is flat, with an obtuse ridge towards the apex, and the under part rounded. The basal half has a slightly elevated keel; scales cover the whole upper part, excepting quite at the point, whilst the sides and under part are denuded, rounded and smooth. There are only two other points to which I will call particular attention. One is the large size of the basal joint of the tarsus, this joint being larger and even more dilated than the penultimate joint; the other is furnished by the claws, which are so closely united as to appear to form only a single claw; but under a strong lens, the extreme points are seen to be separated.

Synaptonyx ovatus.

Breviter ovatus, convexus, niger, squamulis cinereo-albidis tectus; antennis, articuloque ultimo tarsorum ferrugineis; rostro piceo, supra albido-squamoso, subtiliter punctulato, basi carinato, apice utrinque sub-elevato-marginato, supra os obtuse carinato; fronte linea longitudinaliter impressa, notato; thorace subtilissime punctulato, parce squamoso; elytris

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striato-punctatis, interstitiis latis, parce setulosis, punctis irregularibus notatis; apice singulatim sub-mucronatis.

Long. corp., rostr. excl., lin. 2⅔; lat. lin. 1⅔.

Hab. in Nova Hollandia.

In the specimen from which this description is taken the terminal segment of the abdomen is raised in the middle, and terminates in an obtuse point. This part may differ in the sexes. The legs are moderate as to size (or perhaps rather small); the femora are very little incrassated in the middle, and unarmed; the tibiæ straight and cylindrical, but dilated at the apex, which is not provided with a spur; the anterior tibiæ are very indistinctly crenulated on the inner side.

CHELOTONYX,* nov. gen. ERIRHINIDÆ.

Antennæ tenues, ante medium rostri insertæ, scapo oculos non attingente; funiculo 7-articulato, articulis duobus basalibus longiusculis obconicis, reliquis brevibus subturbinatis; clava oblongo-ovata, acuminata. *Rostrum* thorace fere duplo longius, sub-rectum, carinatum. *Oculi* ovati, depressi. *Thorax* latitudine baseos brevior, prope apicem constrictus, lateribus obliquis, basi sat profunde bisinuatus, antice leviter emarginatus, pone gulam profunde emarginatus. *Scutellum* oblongum. *Elytra* ovata, antice thorace latiore, basi singulatim subrotundata; humeris rotundatis; apice rotundata. *Pedes* mediocres, antici longiores robustiores; femoribus anterioribus valde crassis, subtus dente magno postice serrato instructis; tibiis anticis curvatis; tarsis longis, angustis; unguiculis bifidis. *Corpus* breviter ovatum, convexum, squamosum, mediæ magnitudinis.

The insect upon which this genus is founded bears much resemblance to the species of *Balaninus*—the body, however, is of a more regular oval form; its nearest affinities, nevertheless, are undoubtedly with the genus *Prionomerus*, from which it may be distinguished by its more elongated rostrum and tarsi, and by the claws being deeply cleft.† The antennæ, moreover, are longer, and have a smaller club, and the form of the body differs considerably.

Chelotonyx Batesii.

Breviter ovatus, nigro-æneus, squamulis piliformibus albidis sat dense adspersus; rostro punctato, supra tricarinato; capite

* From χηλωτὸς, cloven, split, and ὄνυξ, claw.

† In *Prionomerus* there is a large square appendage at the base of each claw.

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punctato, fronte foveolata; thorace sat crebre punctato; elytris punctato-striatis, interstitiis subtiliter disperse punctulatis, pallido-tessellatis.

Long. corp., absq. rostr., lin. 3¼.

Hab. Para.

I name this species after Mr. Bates, who has not only forwarded to England numerous collections of insects and objects of natural history from the Amazon district of South America, but has also furnished us with interesting observations on the habits and geographical ranges of many of the species he has met with.

ANOMŒARTHRIA,* nov. gen. BARIDIIDÆ.

Mas.? *Antennæ* longiusculæ; scapo valde clavato; funiculo 7-articulato, longe ciliato, articulo primo breviusculo obconico, 2o magno fere ovali, reliquis gradatim minoribus sub-ovalibus; clava oblongo-ovata. *Rostrum* longum, crassiusculum, sub-compressum, arcuatum, apice attenuatum, depressum. *Oculi* laterales, magni, depressi. *Thorax* sub-conicus, antice valde constrictus. *Scutellum* sub-quadratum. *Elytra* oblonga, humeris obtuse angulatis, a basi ad apicem sensim angustata, pygidium haud tegentia, supra parum convexa. *Pedes* longiusculi, femoribus incrassatis; tibiæ posticæ intus, articuloque primo tarsorum quatuor posticorum dense ciliato.

Fœmina? Rostrum longius, tenuius, prope basin valde arcuatum, basi solum incrassatum; antennæ non ciliatæ, articulis duobus basalibus funiculi longiusculis obconicis, reliquis brevioribus; pedes simplices; elytra pygidium tegentia.

The two insects, which I assume to be male and female, I received in a series of *Coleoptera* from Minas Geraes: they are pinned with the same pin, and hence, in all probability were caught together, and they agree perfectly in all respects, excepting in certain peculiarities of structure found in the antennæ, rostrum and legs—in fact in those parts which are known to vary in the sexes. The new genus which I have established for their reception should in my opinion be placed near *Lobodercs*. The female is remarkable for the very sudden bending under of the rostrum at a point which is rather behind the middle; the apical portion is much depressed, the basal portion is incrassated and compressed. In the male the rostrum is much arched, rather shorter than that of the female, but still fully equal to the head and thorax in length; a small portion at the apex, being about one-

* From ἀνόμοιος, dissimilar, and ἄρθρον, a joint.

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fourth of the entire length, is rather slender and depressed; the remaining portion is compressed and incrassated. The scape of the antennæ is much incrassated at the apex; the joints of the funiculus of the antennæ each give origin to numerous long curved hairs, and their structure is very peculiar; the first joint being small, the second very large, fully twice as broad as the first, and of a nearly ovate form; the remaining joints keep nearly the same form, but decrease rather rapidly in size, the last joint being minute. Then, again, in the legs this sex present some peculiarities; they are nearly equal as to length, but the anterior pair slightly exceed the others; the femora are considerably incrassated in the middle; the middle pair of tibiæ at the apex, the posterior tibiæ on the inner side, the posterior femora on the under side, and the basal joint of the four posterior tarsi, are clothed, each of these parts, with a dense brush of velvet-like yellow hairs; the under side of the thoracic segments, and of the first joint of the abdomen, are also clothed with bright yellow hairs in the male. In the female they are wanting on all these parts.

Anomœarthria cæruleopennis.

Oblongus, ater, nitidus; capite rostroque sub-remote punctatis; fronte foveolata; thorace subtiliter punctulato; elytris purpureo-cæruleis, humeris nigris, puncto utrinque prope scutellum flavo-vel albido-squamoso ornatis, simpliciter striata, interstitiis planis, subtilissime punctulatis; corpore subtus sat crebre punctato.

♂ Long. corp., rostr. excl., lin. 3; lat. lin. 1½: ♀ long. lin. 2⅝.

Patria Brazil, ad Minas Geraes.

The sides of the thorax are nearly straight and parallel in the hinder part, but near the fore part they curve inwards to the contracted part in front, which is tubular, and only sufficiently broad to hold the head; the elytra are rather long, distinctly broader at the base than the thorax; the humerus is obtusely angular, and from the humerus towards the apex the diameter of the elytra gradually diminishes, the outline presenting but an indistinct convex curve; the apex is obtusely rounded.

PROTOPALUS, Schönherr.—CRYPTORHYNCHIDÆ.

Stirps I.—Antennæ articulis 1° et 4° funiculi longiusculis obconicis; 2° et 3° longioribus, subæqualibus, reliquis brevibus.

P. Stephensii (Hope), Schö. iv. p. 45.

I have in my cabinet an insect from Moreton Bay which agrees

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with Schönherr's description of *Protopalus Stephensii* so perfectly in all respects, excepting that the rostrum is not crenulated beneath, and the anterior legs are but a trifle longer than the others, that I strongly suspect their differences merely indicate a distinction of sex. Furthermore, I possess a second species from the same locality, which has all the essential characters of the first mentioned, but which differs in the relative length of the joints of the antennæ. Now, setting aside these points, there are so many other characters which are common to my two insects, and in which they agree with the definition of *Protopalus Stephensii*, that I feel satisfied they should all be placed in the same genus; in which case the generic characters will require to be modified.

Stirps II.—Antennæ articulo 2° primo plus duplo longiore; articulis 1° et 3° longiusculis, obconicis, reliquis brevibus.

Protopalus Schönherri.

Oblongus, ater, griseo-squamosus; fronte depresso; rostrum parum arcuato, disperse punctulato, basi utrinque sulcato; thorace tuberculis rotundis, nitidis, sat crebre obsito, antice alte carinato; elytris dorso gibbis, punctato-striatis, interstitiis dorsalibus tuberculis parum elevatis, nitidis, seriatim obsitis; interstitio 2° prope basin tuberculo elevatiore, subacuto instructo; interstitiis 2°, 4° et 6° sub-elevatis; lateribus profunde punctato-sub-sulcatis, interstitiis angustis, nitidis; dorso postico maculis nonnullis parvulis albidis notato; femoribus obtuse dentatis.

Long. corp., rostr. excl., lin. 7⅓; lat. lin. 3¼.

Hab. ad "Moreton Bay," Novæ Hollandiæ.

This insect very much resembles the insect which I take to be the female of *Protopalus Stephensii*. The rostrum, however, is less curved; the keel on the fore part of the thorax rather less raised, and the sutural part of the elytra is less elevated, though still considerably humped. The eyes, as in that insect, are vertical, lateral (though slightly approximated), and directed somewhat forwards; the region of the eye above, and internally, is depressed in both; but in the present insect, the depressed areas being rather broader, there is no mesial ridge left as in *P. Stephensii*. The sculpturing of the elytra accords very well with that of *P. Stephensii*, but the punctures on the dorsal surface are less deep. I see no difference in the general outline, excepting those differences occasioned by the thorax and elytra being rather less humped.

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PEZICHUS,* nov. gen. CRYPTORHYNCHIDÆ—divis. I.

Antennæ longæ, tenues; funiculo 7-articulato, articulo primo breviter obconico, 2° longissimo, 3-4 obconicis, reliquis brevibus; clava valde elongata, subcylindrica, sub-solida. *Rostrum* longum, tenue, parum arcuatum. *Oculi* laterales, depressi. *Thorax* angustus sub-conicus, lateribus postice fere rectis, apice supra rotundato-productus, utrinque profunde emarginatus, pone oculos lobatus, postice leviter bisinuatus. *Scutellum* rotundum, valde convexum. *Elytra* oblongo-ovata, antice thoracis basi multo latiora, trisinuata, pone thoracem subito emarginata, postice acuminata. *Pedes* longissimi, tenues, sub-æquales; femoribus linearibus, subtus dentatis; tibiis sub-arcuatis, apice unco instructis; tarsis longis angustis, articulo primo perlongo, ultimo bi-unguiculato. *Corpus* oblongo-ovatum, convexum, sculpturatum, squamosum, alatum, mediocris magnitudinis.

In the structure of the antennæ *Pezichus* greatly resembles the genus *Cylindrocorynus*, but these organs are rather longer and more slender in the present genus. In the great length of the legs, the non-clavate femora, and the long slender tarsi, a nearer approach to *Pezichus* is made by the Australian genus *Protopalus*, and I think these two genera should be arranged near to each other.

Pezichus binotatus.

Oblongus, niger, squamulis fuscis inæqualiter vestitus; antennis fusco-ferrugineis; rostro basi subtiliter punctulato; thorace angusto, antice constricto, dorso postico, lateribusque tuberculis inæqualibus parum elevatis obsito, dorso elevato-carinato; scutello nigro, nitido; elytris profunde et remote ocellato-punctato-striatis, interstitiis angustis, convexis, alternis elevatioribus, tuberculis parvulis nonnullis fusco-squamosis adspersis, tertio a sutura in medio elevato-carinato, pone scutellum tuberculo validiori instructo, singulo elytro dorso postico vitta parva obliqua, sub-transversa, sordide albo-squamosa notato.

Long. corp., rostr. excl., lin. $5\frac{3}{4}$; lat. lin. $2\frac{1}{3}$.

Hab. ad "Moreton Bay," Novæ Hollandiæ.

The scales, which somewhat irregularly clothe the legs and body in this insect, are very minute, and on the interstices of the

* From πεζιχὸς, a pedestrian, a name suggested by the great length and slenderness of the limbs.

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striæ of the elytra they are aggregated in little patches. Each of the large punctures of the striæ encloses a scale of larger size and paler colour. On the second interstice is a distinct tubercle not far from the scutellum, and in the middle of the back the same interstice is raised into a crest, which terminates at the commencement of the posterior third of the elytra, and crossing this crest in an oblique manner is a small dirty white mark; it extends from the first to the third striæ. The fourth interstice presents three or four tubercles on the basal half; they, however, are but little raised. The form of the elytra at the base is rather peculiar: at this part they are fully one-fourth broader than the thorax, and immediately opposite the base of that segment they are suddenly cut in to admit the thorax, so that a projecting angle is formed on either side, and from this angle the outline of the elytra runs outwards a short distance, and very little backwards, to join the outline of the sides, so as to form an obtuse angle: the sides of the elytra are at first parallel, but behind the middle they gradually converge towards the apex, which is much contracted. The keel on the thorax is considerably raised on the fore part, but it vanishes near the posterior margin. The basal joint of the long and slender tarsi is about equal in length to the other three joints taken together; the spongy substance beneath the joints is almost white.

GLOCHINORHINUS,* nov. gen. CRYPTORHYNCHIDÆ—divis. I.

Antennæ mediocres; funiculo 7-articulato, articulis duobus basalibus longiusculis, obconicis, 3-6 gradatim brevioribus, articulo ultimo longiore, ad basin tenui, apice clavæ adpresso; clava ovata. *Rostrum* longum, perparum arcuatum, subdepressum; in *mare*, utrinque prope medium spinis duabus armatum. *Oculi* laterales, parum convexi. *Thorax* magnus, sub-oblongus, basi sub-sinuato-truncatus, ante scutellum paulo productus, lateribus basi sub-rectis deinde rotundato-attenuatis; apice supra rotundato-productus et sub-depressus; pone oculos lobatus. *Scutellum* sub-rotundatum. *Elytra* oblonga, sub-cylindrica, basi thoracis non latiora, illoque vix dimidio longiora, basi trisinuata, apice conjunctim rotundata. *Pedes* longi, tenues, antici reliquis paulo longiores, tibiis apice unco intus flexo, armatis; tarsis longis, angustis, articulo primo perlongo, ultimo biunguiculato.

The nearly cylindrical form of the body, the barbed rostrum in

* From γλωχίς, the spike or point of a spear, and ῥὶν, the snout—a name suggested by the barbed condition of the male.

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the male, and the structure of the funiculus of the antennæ, in which the terminal joint is longer and more slender than the joints immediately preceding, and nearly as long as the basal joints, form the chief peculiarities of this genus: in the length and slenderness of the legs, and in having the basal joint of the narrow tarsi very long, it approaches most near to *Pezichus*.

Glochinorhinus Doubledayi.
Protopalus Doubledayi, Jekel's MSS.

Oblongus, sub-cylindricus, squamulis cinereis vel fusco-cinereis tectus; fronte foveola minuta impressa; thorace utrinque tuberculato, dorso interrupte carinato, setulis nigris adsperso; scutello sordide albo; elytris sub-seriatim punctatis, interstitiis alternis inequaliter tuberculatis; femoribus quatuor posterioribus subtus obsolete dentatis.

Mas. Rostro spina laterali prope medium, sat longa, extrorsum et retrorsum curvata, et pone hac spina parvula antrorsum cavata, instructo, supra squamoso, basi tuberculis minutis, nitidis adsperso, antice rugoso.

Fœm. Rostro denudato subtilissime punctulato.

Long. corp., rostr. excl., 5¼ lin.; lat. lin. 2⅓.

Habitat "Moreton Bay," Novæ Hollandiæ.

The tubercles on the elytra in this insect are subject to some little variation; the second interstice has short crests, one behind the other, the first a little removed from the base, and the last is remote from the apex of the elytra; they appear to be composed of an aggregation of small tubercles having the summits many-pointed; on the third interstice is a single small tubercle in the middle; on the fourth are three small tubercles close together near the middle, then two other isolated tubercles behind these, and a subapical group of three or four small tubercles close together; on the sixth interstice is a series of small tubercles, of which the foremost, at the base of the elytra, is long.

Genus Poropterus, Schönherr (Cryptorhynchidæ).

Amongst the numerous undescribed species of *Cryptorhynchides* from New Holland, I possess several species remarkable for their general form, and for having the thorax and elytra studded with tubercles; and amongst these are some which I think should be associated with the described species of *Poropterus*, but which, instead of having the produced portion of the thorax, above the head, rounded at the extremity, have that part terminating in two

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projecting angular processes, and in which the apex of the elytra terminates in the same manner; these, again, may be subdivided according to differences in the proportions of the joints of the funiculus, thus:—

Sect. I.—*Articulis duobus basalibus funiculi longiusculis obconicis, articulo 2° primo multo longiore.*

Protopterus Chevrolatii.

Elongato-ovatus, fusco-squamosus; rostro rugoso, carinato, squamulis setiformibus obsito; thorace oblongo, lateribus rotundato-ampliato, apice valde attenuato-producto, antice angulatim emarginato; dorso antico plano, canaliculato, postico convexo, rugoso, longitudinaliter impresso, breviter carinato, utrinque obtuse tuberculato; elytris granulatis, dorso tuberculis plurimis, obtusis, rugosis, instructis, lateribus profunde seriatim punctatis, interstitiis subelevatis, fascia obliqua, indeterminata, ab humeris oblique ad medium ducta, sordide albido-squamosa, decoratis; apice pallido-squamosis, mucronatis.

Long. corp., absq. rostr., lin. 6½; lat. lin. 2½.

Habitat ad "Moreton Bay," Novæ Hollandiæ.

Rostrum nearly one fourth shorter than the thorax, which latter is rather longer than broad; a little in front of the middle, the sides of the thorax are rather suddenly cut in, and from that part to the front they are straight and converging towards the fore part, so that the lobe, which projects considerably beyond the head, is very narrow in front, where it terminates in two semi-acute points. All this part of the thorax is flat above, but grooved along the middle; on the hinder part of the thorax the sides are rounded, but there is a slight notch on either side rather behind the mesial line; the dorsal surface is convex, rugose, has some small scattered granules, and is furrowed along the middle; in the centre is a short keel. The elytra are rather less than double the length of the thorax, and of an elongate ovate form, terminating posteriorly in two conical tubercles; at the base they are scarcely wider than the thorax at the same part; they are moderately convex, and the whole dorsal surface is very uneven: besides numerous little granules there are about ten tubercles on each elytron, these varying somewhat in size, of a more or less rounded form, and rugose at the summit. They are thus disposed:—three (considerably separated from each other) in the position of the second interstice of the striæ; one in the third, about midway between the base and apex of the elytra, three in the fourth; one

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in the sixth, nearly opposite that in the third; and two (one behind the other) at the shoulder. The colouring of the scales vary somewhat in different individuals, and the markings are often very indistinct; usually the scales are brown, but on the sides and fore part of the thorax of a very pale ash colour, inclining to white, and sometimes with a faint greenish tint: a pale undefined band crosses the elytra, running obliquely inwards from the shoulder almost to the suture near the middle; below and external to this is a small patch, which is sometimes connected with a patch at the apex; these markings are of the same pale colour as the sides of the thorax. The legs are moderate as to length, and clothed with scales and short setæ: the femora are nearly linear and without teeth.

Poropterus Jekelii.

Oblongo-ovatus, fusco-squamosus; rostro ruguloso-punctato, fronte plana; thorace lateribus rotundato-ampliatis, in medio incisis, antice attenuato-producto, apice supra emarginato, dorso parum convexo, carinato, utrinque tuberculo rotundato instructo; elytris ovatis, sub-seriatim punctatis, rugosis, decem tuberculatis, granulisque nitidis parce adspersis; apice mucronatis.

Long. corp., rostr. excl., lin. 6⅔; lat. lin. 2⅔.

Patria "Moreton Bay," Novæ Hollandiæ.

Proportionably shorter and broader than *P. Chevrolatii*, the thorax less convex, less produced in front; elytra with the tubercles larger, and the two conical processes with which they are terminated also larger; the antennæ more slender.

Head and rostrum together about equal to the thorax in length; rostrum somewhat rugosely punctured, the punctures more numerous on the apical portion, where there are some delicate longitudinal ridges on either side; head nearly flat in front, with a faint longitudinal depression in the middle, and a somewhat indistinct angular depression at the base of the rostrum; the surface impunctate, but with large and small scales in tolerable abundance. Thorax with the length and width equal, the upper surface nearly flat in front and near the sides, the mesial portion slightly convex, with a short keel, and a rounded tubercle on either side at a short distance from the keel. From these tubercles a ridge, which is obtuse and but little raised, and runs forwards towards the apex of the thorax, and a third ridge, or, it may almost be termed, a denuded line, runs between them; a few slightly raised

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granules are seen on the hinder half of the thorax; the sides are rounded, have an uneven outline on the hinder half, and a distinct notch in the middle: where they join the anterior lobe, which projects over the head, they are considerably contracted; the sides of the lobe are straight, converging anteriorly, and the apex is notched. Elytra less than twice the length of the thorax, and rather broader and strongly convex in the middle; two rows of very large shallow foveæ are seen on the sides, and on other parts are smaller depressions, but disposed without order, the whole upper surface being very uneven. Granules are sparingly scattered over the surface, and each elytron has five large rounded rugose tubercles; three in a line at a little distance from the suture, the middle tubercle being placed about halfway between the extremities of the elytra, the foremost about midway between the middle one and the base of the elytra, and the hindermost very little more removed from the middle tubercle than that is from the first; the remaining two large tubercles are external to the three noticed, not far removed, and nearly opposite their interspaces: besides these there is a small tubercle near the shoulder, and an oblong tubercle behind this near the middle of the lateral portion of the elytra. Each elytron has an obtuse transverse ridge at the base, which extends from the suture nearly to the shoulder, becoming broader externally. The apical processes are larger and more produced than in *P. Chevrolatii*, and have a nearly triangular base. The whole of the upper parts are covered with minute brown scales, but these do not quite hide the surface; and, mixed with them, are scattered large scales; on the summits of the tubercles there are large scales, and on the apex of the thorax the scales are sub-setiform. The legs are covered with brown setiform scales, with an admixture of small black setæ; the femora are edentate.

I have named this species after M. Jekel of Paris, so celebrated for his knowledge of the *Curculionides*, and to whom I am indebted for much information on this branch of Entomology.

Poropterus Parryi.

Niger fusco-squamosus; rostro punctulato, subcarinato; fronte depressa, foveolata; thorace antice utrinque valde constricto, parum producto, bituberculato, dorso parum convexo utrinque bituberculato, in medio breviter et obtuse carinato, lateribus parum rotundato-ampliatis ante medium tuberculo instructis; scutello rotundato, albido-squamoso; elytris oblongo-ovatis parum convexis, sub-seriatim punctatis, tuber-

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culatis, postice productis apice tuberculis binis validis instructis; singulo vitta parvula albida ante apicem notato.

Long. corp., rostr. excl., lin. 7⅓; lat. lin. 3¼.

Hab. "Sydney," Novæ Hollandiæ.

Larger than *P. Jekelii*, which it most nearly resembles; and besides differing in having the two basal joints of the funiculus equal, it may be readily distinguished by the thorax having four tubercles on the upper surface, and by its having the apex less produced, &c. Here the fore part of the head (which is very convex and almost bituberculate) projects beyond the anterior margin of the thorax, whilst in *P. Jekelii* and *P. Westwoodii* the apical portion of the thorax projects considerably beyond the head. The more convex and narrower form of *P. Chevrolatii*, combined with the more elongated conical tubercles on its elytra, serve to distinguish that species from the present; the seventh joint of the funiculus, moreover, in *P. Chevrolatii* is nearly equal in length and breadth, whilst in *P. Parryi* the same joint is much broader than long. The thorax is equal in length and breadth, has a transverse impression near the apex above, and at the sides a continuation of the same impression is very deeply cut in; in front of the impression are two tubercles immediately above the head; in the middle of the dorsal surface is a short and very obtuse carina, and on either side of the disc are two tubercles, placed one behind the other and near together; the foremost is very little removed from the transverse impression before noticed; from the indentation in front, the sides are gently rounded to the base, and rather in front of the middle is a smallish tubercle projecting laterally; on the hinder part of the thorax above are some large rugæ. The elytra are twice as long as the thorax, and in the middle about one third broader, and but little convex above; the punctures on them are large and irregularly disposed, as if the rows were bent aside in parts, to make room for the large tubercles: there are three large obtuse tubercles on the second interstice, of which the hindermost is the largest, and situated at the commencement of the posterior third of the elytra; on the fourth interstice are two large tubercles, and on the sixth there are also two tubercles, of which the foremost is very large, and placed at the humeral angle; the second is opposite the interspace of the two tubercles on the fourth interstice; and besides these there is a lateral tubercle situated about midway between the base and apex of the elytra, and four smaller tubercles on the base of the elytra. A large conical tubercle, projecting horizontally, springs

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from the apex of each elytron: on each elytron is a small oblong dirty white mark, at some little distance from the apex, and this spot terminates posteriorly in a small tubercle covered with the same whitish scales. The scales are more dense on all these tubercles than on other parts. The body beneath is flat, has scattered brown scales, and fine, dispersed punctures. The legs are well clothed with scales, and each femur has a pale ring towards the apex.

The specimen from which this description is taken is in the collection of the British Museum.

Sect. II.—*Articulis duobus basalibus funiculi elongatis, æqualibus.*

Poropterus Westwoodii.

Elongato-ovatus, cinereo- et fusco-squamosus; rostro rugoso, sub-carinato; thorace sat crebre granulato, intra apicem subito angustato, apice supra truncato, tuberculis duobus, compressis instructo, medio breviter carinato, sub-transversim quadri-tuberculato; elytris rude punctatis, granulis adspersis, tuberculisque validis, conicis, sub-acutis, biseriatim instructis; apice attenuato-truncatis.

Long. corp., rostr. excl., lin. 7¼; lat. lin. 2¾.

Patria, Nova Hollandia.

Distinguished at once from the preceding by the more elongated conical tubercles on the elytra, the anterior lobe of the thorax, and the apex of the elytra being truncated, and by its larger size.

The head and rostrum together are equal to the thorax in length; the latter is slightly curved and sub-depressed, and very rugose above; a somewhat irregular keel runs along the basal half. Thorax nearly equal in length and breadth, convex above, and with glossy black granules scattered over the surface; the anterior lobe projects but little over the head, is truncated in front, but terminated by two compressed and slightly recurved tubercles; in the middle is a short keel, and on either side of this a large obtuse tubercle, besides which there is a horizontally compressed tubercle on the lateral margin rather anterior to the mesial line; behind this, the sides, with a slight outward curve, are gradually contracted towards the base; in front of the lateral tubercle the sides are suddenly much contracted and emarginated, so that the anterior lobe assumes a subquadrate form. The elytra are of an elongate ovate form, rather more than twice the length of

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the thorax, with the humerus projecting and angular, the dorsal surface considerably arched; with coarse punctures and scattered granules, an equal row of fine nearly equidistant tubercles, one of which is small, and close to the apex; the others are large and conical, and the sub-apical tubercle is very large and sub-acute; besides these there is a row of three smaller tubercles arranged in an oblique line, running from the shoulder to the third of the dorsal tubercles. On the sides of the elytra are three rows of comparatively small punctures, and these very widely separated, and each one incloses a scale; between these rows of punctures there are series of large and but little raised granules. The scales are tolerably dense, pale ash colour on the thorax, excepting on the disc and on the tubercles, where they are brown; the granules here and elsewhere are denuded; they are scattered over the surface of the four dorsal tubercles as well as other parts of the thorax. On the sides of the elytra the scales are rufous brown; on the upper parts they are chiefly ash-coloured, excepting on the space between the inner rows of tubercles, where the brown tint prevails. The legs are rather larger and more slender than in the other species described in this paper. On the abdomen are three longitudinal denuded bands.

PLAGIOCORYNUS,* nov. gen. CRYPTORHYNCHIDÆ—divis. I.

Antennæ breviusculæ, validiusculæ, versus apicem rostri insertæ; funiculo 7-articulato, articulo primo breviter obconico, 2° longiore, reliquis brevibus; clava brevis, oblique truncata. *Rostrum* breve, crassum. *Oculi* laterales, parum convexi. *Thorax* sub-conicus, basi sub-truncatus, lateribus vix rotundato-ampliatus, apice utrinque emarginatus, supra valde acuminato-productus, pone oculos lobatus. *Scutellum* minutum. *Elytra* antice thoracis basi vix latiora, trisinuata, humeris antrorsum prominulis, pone medium ampliata, postice valde declivia. *Pedes* validi. *Corpus* oblongum, convexum, sculpturatum, squamosum, apterum (?), majusculæ magnitudinis.

The form of the club of the antennæ in this genus differs from that of other *Cryptorhynchides*, it being short, and obliquely truncated on the outer side, and the terminal joints are as it were thrust into the basal joint; the rostrum is thick, sub-angular, has four irregular keels above, and is unusually short, being but little longer than the head; the thorax is large, much contracted and

* From πλάγιος, oblique, and κορύνη, club.

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produced in front, and keeled above; the elytra are short, the sides nearly straight, but diverging gradually from the base to the posterior third, from which point they rather suddenly converge towards the apex, which might be described as obtusely rounded, were it not that the sutural portion projects and forms an angle in the middle; the apical portion is much bent downwards, so as to form an obtuse angle with the dorsal surface, the sides are nearly vertical, the back moderately convex; the legs rather short and very thick.

Plagiocorynus quadrituberculatus.

Oblongus, niger, umbrino-squamosus; fronte foveolata; rostro valido perparum arcuato, supra ruguso-punctato, irregulariter quadri-carinato, squamulis setiformibus semi-erectis, obsito; thorace utrinque parum rotundato-ampliato, supra convexo, rugoso-punctato, medio carinato, utrinque disci carinula brevi notato; elytris tuberculis parvulis rotundis scrobiculisque alternatim et seriatim notatis; pone medium tuberculis quatuor transversim obsitis.

Long. corp., rostr. excl., lin. 6; lat. lin. 3.

Head coarsely punctured, with a deep fovea surrounded by a slight ridge on the forehead; rostrum with four longitudinal ridges on the basal portion; scape of antennæ apparently with a small tuft of scales in the middle of the under side. Thorax equal in length and breadth, the sides slightly rounded; the margin of the anterior lobe slightly raised; the dorsal keel high, and continued from the base to the apex of the thorax. Elytra rather strongly trisinuated in front, and closely applied to the thorax, with small pits arranged in longitudinal series in place of the ordinary punctures of the striæ; these pits filled with scales, and separated from each other by a small rounded tubercle, which is but little raised—they are most distinct on the sides of the elytra, and are wanting on the apical portion. The interstices are for the most part flat; but the second interstice from the suture is slightly raised. Rather behind the middle of the elytra (at the part where they are suddenly bent down) is a transverse row of four tubercles; the innermost tubercle on either side is large and obtuse, and clothed with erect dusky setiform scales; the outer tubercle is small and obtuse, and clothed with the same rich brown scales as other parts. The legs are densely clothed with scales, which in parts, especially on the tibiæ, assume nearly the form of short bristles.

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I have another *Cryptorhynchus* in my collection, which was sent from Moreton Bay with the above, and which I have no doubt is the male of the same species. It differs in being smaller, much narrower, and in having the head and rostrum very little punctured. Its length is 5½ lines; width 2⅓ lines. In the form of the elytra this insect strongly reminds one of *Leptops quadrituberculatus* and its allies.

CHÆTECTETORUS, Scho. (CRYPTORHYNCHIDÆ.)

C. spinipennis.

Oblongo-ovatus, niger, squamulis rufescentibus, nigrisque variegatus; rostro recto, punctulato, fronte foveolata; thorace supra sub-plano, crebre punctato, antice breviter bicristato, medio carinato; vittis duabus nigris, postice abbreviatis notato; elytris antice sub-depressis, sulcato-punctatis, interstitiis angustis, sub-elevatis, fascia transversa communi pone medium, utrinque abbreviata, singuloque macula parvula, ante medium nigro-squamosis, tuberculo parvulo sub-apicali rufescenti-squamoso insignitis; apice ad suturam acute spinosis, utrinque acute denticulatis; femoribus obutse dentatis.

Long. corp., rostr. excl., lin. 4; lat. lin. 1¾.

Habitat in Nova Hollandia.

SYMPIEZOSCELUS,* nov. gen. CRYPTORHYNCHIDÆ—divis. I.

Antennæ breviusculæ, in fovea oblonga ante oculos insertæ; scapo brevissimo valde clavato, funiculo 7-articulato, articulis duobus basalibus obconicis, 1° latiore, reliquis brevibus, transversis; clava rotundato-ovata. *Rostrum* breviusculum, fere rectum, basi dilatatum, apice sub-depressum. *Caput* convexum, fronte depressa, foveolata. *Oculi* laterales, parum convexi, sub-rotundati, subtus acuminati. *Thorax* longitudine latitudini fere æquali, postice sub-sinuato-truncatus, angulis acutis, in medio, ante scutellum, lobo minuto productus; lateribus obliquis, perparum rotundatis, antice constrictus, utrinque leviter emarginatus, pone oculos sublobatus. *Scutellum* rotundum. *Elytra* thorace vix latiora, illoque duplo longiora, basi conjunctim trisinuata, lateribus perparum ampliata, apice conjunctim rotundata. *Pedes* breves, femoribus magnis, compressis; tibiæ dilatatæ, compressæ, extus prope apicem dentatæ, apice unguiculatæ;

* From συμπιέζω, to compress, and σκελίς, the thigh.

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tarsis parvulis, angustis. *Corpus* oblongum, glabrum, nitidum, elatum, parum convexum, mediæ magnitudinis.

This genus belongs to the first section of the *Cryptorhynchides*, having a well defined rostral groove, which is terminated posteriorly between the coxæ of the anterior and middle pair of legs. It presents several remarkable characters. Its rather short, nearly straight, and somewhat depressed rostrum is remarkable for having the basal portion dilated on either side, forming a little shield protecting a deep fovea beneath, which fovea is oblong, extends back to the eye, and represents the ordinary antennal groove, the base of the antennæ being inserted in it. The scape of the antennæ is short in proportion to the groove which protects it, and is very stout, its form being almost obconic. The first joint of the funiculus is a trifle stouter than the rest; the club is rather large and very short. The legs are singular, being short; the femora large, very broad, compressed; the anterior pair are the largest, and are much arched above; all the femora are deeply excavated beneath on the apical half to receive the tibiæ when the legs are contracted; the tibiæ are short, curved at the base, broad and compressed, have an acute tooth, on the outer side towards the apex; the tarsi are very small and very slender; the two basal joints are destitute of the ordinary spongy substance beneath, but this is not wanting in the bilobed third joint; the claw joint is rather long, and has two well developed, simple diverging claws.

I think this genus is allied to *Pselophax* of White (=*Pteroplectus*, Schönherr), and I can by no means regard the latter genus as being properly placed by Schönherr in the *Byrsopsides*.

Sympiezoscelus Spencii.

Oblongus piceo-niger, nitidus, tibiis tarsisque piceis, antennis rufis; rostro thorace breviore, rufo-piceo, nitidissimo, basi utrinque sub-depresso, punctato; capite punctulato, fronte foveolata; thorace disperse punctato, basi utrinque foveolato, in medio carinula brevissima apice ante scutellum paulo producta notato; elytris profunde punctato-striatis, interstitiis convexis, corpore subtus irregulariter punctato squamulis flavescentibus, præsertim in pectore, adsperso.

Long. corp., rostr. excl., lin. 4; lat. lin. 1¾.

Habitat in Nova Zealandia, vel fortasse Nova Hollandia.

The collection which contained this insect was made up partly of Australian and partly of New Zealand species, hence I am un-

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certain to which country it belongs; I am more inclined to believe it belongs to the latter country. In general appearance it reminds one somewhat of a *Tranes* or an *Iphipus*.

HYBOPHORUS,* nov. gen. CRYPTORHYNCHIDÆ—divis. II.

Antennæ mediocres, minus tenues; articulis tribus basalibus funiculi obconicis, reliquis brevibus; clava breviter ovata. *Rostrum* longitudine fere capitis cum thorace, teres, parum arcuatum, subcarinatum. *Oculi* magni, parum convexi, in fronte approximati. *Thorax* transversus, subconicus, antice valde constrictus, supra in medio sub-elevatus, obtuse carinatus, apice rotundato-productus, pone oculos valde lobatus, basi ante scutellum paulo productus. *Scutellum* oblongum elevatum. *Elytra* subtriangularia, antice sinuato-emarginata, humeris rotundato-subangulato-productis, versus apicem attenuata, apice ipso rotundata; supra convexa, tuberibus tuberculisque obsita. *Pedes* mediocres, femoribus subtus valde dentatis; tibiæ basi curvatæ, apice unguiculo armatæ; tarsis parum latis, subtus spongiosis, biunguiculatis. *Corpus* breve, convexum, valde inequale, haud squamosum, mediæ magnitudinis.

Approaches most nearly to *Rhyssomatus*, but has simple diverging claws, whilst in that genus the claws are bifid,† and differs, further, in having the humeral angles of the elytra produced; the basal joints of the funiculus are shorter, and the four anterior legs are more widely separated at the base. The two last mentioned points of distinction serve also to distinguish the new genus from *Chalcodermus*. The thorax in *Hybophorus* is more deeply sinuated behind, more deeply emarginated on either side at the apex, and more strongly lobed behind the eyes, than in either of the two genera with which it is compared. Scape of the antennæ inserted about midway between the middle and the apex of the rostrum, and reaching back nearly to the eye, and but little clavate: three basal joints of funiculus obconic, the third shorter than the other two, which are but moderate as to length; the remaining joints short, at first subturbinate and then transverse: club short, the joints tolerably distinct. Eyes very large, very nearly touching each other on the forehead; the facets rather

* From ὑβός, a hump, and φορέω, to bear.

† A character which has been overlooked, but which is important. I shall take an early opportunity of pointing out some peculiarities which I have noticed in the claws of certain genera of *Curculionidæ*.

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larger and more distinct than usual. Anterior coxæ separated to continue the rostral groove, which is moderately deep and sharply margined on the under side of the prothorax, but is not continued beyond. Terminal segment of the abdomen with a transverse fovea,—perhaps a sexual character. Femora bidentate beneath, a small tooth in front of a very large one.

Hybophorus rufotuberosus.

Sub-rhomboideus, ater, parum nitidus, pedibus nigro-piceis, antennis piceo-rufis; rostro leviter carinato, basi punctato-subsulcato, apice subtilissime punctulato; capite punctato thorace antice valde constricto, supra in medio sub-elevato, et obtuse carinato, lateribus ante medium rotundato, postice recto; ante apicem punctis magnis nonnullis transversim dispositis, lateribus profunde et sub-remote punctatis; elytris piceo-nigris, supra valde inæqualibus, tuberibus tuberculisque rufescentibus obsitis, interstitiis granulis nigris, nitidis, sat crebre adspersis, sutura lævigata; femoribus bidentatis.

Long. corp., absq. rostr., lin. $3\frac{2}{3}$; lat. lin. $2\frac{1}{3}$.

Patria, Nova Hollandia.

The keel on the thorax is considerably elevated but not sharp, is most raised towards the fore part, and does not extend quite to the base; in the constricted portion of the thorax in front are seen, on each side of the keel, a row of about six or seven large oblong punctures; on the disc are a few rather obscure punctures, and towards the sides are a few irregularly disposed large punctures; on the sides the large punctures are rather numerous; the upper surface of the thorax, excepting in the parts alluded to, is smooth and rather dull. The tubercles on the elytra vary much in size and form; the most conspicuous are—a large tubercle at the shoulder, which is of a three-sided pyramidal form—it is black, with the angles dull red; a large tubercle about midway between the base and apex of each elytron, and near the suture, oblong and rounded, excepting on the inner side, where there is a depression containing one of the little glossy black granules which are rather thickly dispersed in all the cavities between the tubercles and rugosities of the elytra; behind the humeral tubercle is another tubercle, which is tolerably large; a fourth tubercle is situated in front of the great mesial one, and a fifth between this and the humeral hump; besides which are two sub-apical tubercles, one apical—and several others on the lateral portions of the elytra,

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which are very irregular—is less prominent. All these tubercles are more or less red; those near the apex very bright. The under parts of the body, with the exception of the abdominal segments, are very coarsely and irregularly punctured. On the legs are some coarse punctures, more particularly on the femora, which in parts are sulcated.

I have reason to believe this insect is from Moreton Bay, but am not quite certain.

XXII. *Contributions to the Natural History of British* Microlepidoptera. By J. W. Douglas, Esq. (*continued from* p. 124.)

[Read 6th June, 1853.]

Genus Bedellia, Stainton. (Pl. XVII.)

The single species at present constituting this genus is in many respects the most anomalous among the *Tineidæ*. In its general slenderness and attitude in repose it resembles *Gracillaria* and *Ornix;* in the very narrow posterior wings it approaches *Cosmopteryx;* in the larva living within the substance of a leaf it has the habit of *Elachista*, while the pupa is unlike that of any of the *Tineidæ* I know,—except, perhaps, some of the *Elachistæ*. The doubtful relation of this moth, derived from the characters afforded by the perfect state, in which condition only it was till recently known, is shown by its various location by different authors. It first appeared in Mann's Catalogue as *Gracillaria Convolvulella;* then Zeller, in 1847 (Isis, 894), described it as *Lyonetia somnulentella*, but in 1848 (Lin. Ent. iii. 264), after an examination of the neuration of the wings, he was convinced it was no *Lyonetia*, and yet could not determine that it belonged to any existing genus; and Stainton in 1849 (Cat. 23), without knowing that Zeller's remark, above alluded to, applied to this species, separated it as a distinct genus under the name *Bedellia*.* The consideration of all the facts of its natural history induces me to think it should be placed near the *Elachistæ*.

* In honour of Mr. George Bedell, the first and foremost of modern English collectors of *Microlepidoptera*.

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For a long time the typical specimen taken by Mr. Bedell was the only English example known, but on the 5th of August last year, in the lane from Greenhithe to Darent Wood, I found four caterpillars mining leaves of *Convolvulus arvensis*, and the next day at Lee I discovered a considerable number. Four-fifths of these produced only Ichneumons, but from the others I reared the moth. Mr. Stainton and I had repeatedly, but in vain, searched the leaves of *Convolvulus Sepium* for a miner, which Mr. R. C. R. Jordan informed us he once found on that plant in Devonshire, and from which he had bred a moth. We had concluded there was some mistake, and we now thought this was the insect, and that we had been told the wrong specific name of the plant; but in September last Mr. Stainton, when in Devon, found that the larva of this species did there, though but rarely, feed on *C. Sepium*. Mr. Jordan unfortunately lost sight of the moths he had reared, or this very interesting addition to our knowledge might long ago have been less of a stranger to us.

Bedellia somnulentella, Zeller.

Larva (fig. 1 *a*). Length 4½ lines. Pale green. Head small, with a narrow V shaped mark in the centre, and a dark mark on the margin. Down the centre of the back a purplish line, on each side of which is a row of purple spots with a white pupil, from which proceeds a hair; one of these spots is on each segment, and they are connected by a slight suffusion of purple. A second row of purple spots is just above the legs; the posterior segments tapering.

Six pectoral, eight ventral and two anal legs, green.

Mines in leaves of *Convolvulus arvensis*, rarely in those of *C. Sepium*, forming white blotches (fig. 1 *b*). The tenements are kept quite clean, all the excrement being protruded. The larva passes all its life under cover, except during the short intervals when it has left one leaf, and is seeking another in which to bury itself. At such times, or by violently breaking open its dwelling, may be observed the peculiar method of progression, which somewhat resembles that of the *Geometridæ* (fig. 1 *c*).

Found from 5th to 16th August, and from 15th to 24th September, there being two consecutive broods.

Pupa (fig. 1 *d*). Length 3½ lines. Pointed at both ends, broad at the thorax, abruptly narrower, but very much elongated anteriorly, gradually tapering posteriorly. The general form is very like that of the pupa of a *Pontia;* when laid upon its back the

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shape closely resembles that of a boat with an elongated prow. Colour at first pale green, both ends tipped with brown; afterwards black-brown, with the back greyish; two white dots on each segment, divided by a fine white line running down the centre and connected lengthwise by a broader black line; each segment is bordered transversely by a fine white line, close to which, at the margin of the wing case, is a black mark. The antennæ reach far beyond the wing cases.

The pupa is suspended under a leaf in a fine silky spinning, with a few threads drawn across the head and tail, holding it firm; and it is sometimes seen hung up by these alone, like a hammock (fig. 1 *e*). The pupa state exists from ten to fourteen days.

Imago (fig. 1). The perfect insect flies but little, and then only a short distance; if the leaf or twig on which it is sitting be touched, it falls to the ground; hence the reason it has so seldom been found. Its manner of sitting is peculiar. It loves to be at the edge of a leaf, the fore part of its body raised up and projecting far over, the fore legs drawn in—not put out like a *Gracillaria*—the antennæ laid along its side, and the end of the wings touching the leaf. In this position it looks as if it were asleep, and hence probably its specific name.

Genus Elachista, Treitschke. (Pl. XVIII.)

Until quite recently the larvæ of the *Elachistæ* were almost unknown, although the smaller ones of *Lithocolletis*, *Bucculatrix* and *Nepticula* had been discovered. In 1851, Mr. Logan bred one species from the stem of a grass; last year I also found a larva in a blade of grass, and this spring several other species have been detected, chiefly by Mr. Stainton and Mr. Scott of Renfrew; so that having, we believe, found out the habit of the larvæ of the genus, there is now reason to hope we are in the right way to obtain all the species—at least that numerous section which, in Stainton's Catalogue, begins with *albifrontella* and ends with *Cygnipennella*, and to which the following observations relate. All hitherto found mine in blades of grass between the cuticles; and though the tracks they make soon become discoloured, it requires some practice and patience to see them, but different species may be recognized by the variation in the manner of making the mine, or in the different species of grass attacked. If, as is probable, the larvæ of the whole of this section be grass-miners, it may be as well, in order to facilitate future discoveries, to show in how many points those at present observed differ from

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each other. They may be divided into two groups—one mining the upper part of the grass, never descending to the base—the other mining down the leaf continuously towards the root. Of the first group the larvæ when full fed quit their mine, and, attaching themselves to the leaf, pass into the pupa state; of the second group, the larvæ do not appear to come out of their mine to undergo their change, but as we have not succeeded in rearing any of them, no positive information can be given. Two kinds of mines also have been observed; one in which the cuticles that have been separated are not distended, the other in which these assume a tubular or inflated appearance.

The larvæ are unicolorous, destitute of marking except patches more or less dark on the second and last segments, and slight depressions over the whole of the upper surface; anteriorly they are flattened, and the third and fourth segments are wider than the others. The pupæ are short and stout, and the back being raised and curved, they look contracted; the wing-cases are drooping and project lower than the body; the penultimate segment of the body on the underside is furnished at its outer margin with a dense tuft of short stiff hairs, and the last segment is rounded and covered *in situ* by the dark shrivelled skin of the larva, which is held in a spinning of silk. The flight of the perfect insects is in the evening; it is low and interrupted by frequent short rests, during which they sit closely appressed to the leaf or other object on which they alight—this position being very characteristic of the genus when at rest.

Elachista subnigrella, new sp.

Larva (fig. 1 *a*). Length 3 lines. Uniform pale yellow, with fine depressions on the upper surface towards the sides, with a few short hairs along the whole surface, more thickly set at each extremity of the body. Head pale brown, the posterior part visible through the second segment. On the second and anal segments is a faint dark patch.

Six pectoral legs light brown, eight ventral and two anal legs the colour of the body; all very short.

Feeds in the leaves of *Bromus erectus*, making broad tracks, which often turn purple, but the cuticles do not separate (fig. 1 *b*). Discovered by Mr. Stainton on the Croydon tram-road and at Mickleham in April last.

Pupa (fig. 1 *c*). Length 2 lines. Brown, thick, somewhat flattened, the back curved lengthwise and raised into a ridge, of which the summit is whitish; at the sides is a similar but smaller

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projection, the colour being darkest at the bottom of the furrows thus formed. Fixed at the anal extremity to the upper surface of a blade of grass near the part where in separates from the stem, and held secure within the curvature of the leaf by a silken thread thrown across the body beyond the middle, the surface of the leaf at this spot being covered with a slight web of silk.

Imago (fig. 1, ♂ and ♀.) Often found in chalky places among grass in June and August, being one of the commonest of our small moths in such localities. The sexes differ considerably in colour, the female being smaller and darker than the male, and the fasciæ whiter and more distinct.

The species is altogether very similar to *E. nigrella*, but independent of differences in the perfect insects, there are the others of the larva and its habits which indicate a distinction.

Elachista Megerlella, Hübner?, Stephens.

Larva (fig. 2 *a*). Length 3½ lines. Dull greenish grey, with very few hairs; third and fourth segments wide, thence gradually tapering; the upper surface, towards the sides, with dark depressions, about three on each side of a segment. Head small, pale piceous; second segment with an irregular piceous patch on the upper surface, obtusely angled in front, widened posteriorly, and with a white line in the centre; anal segment with a piceous patch.

Six pectoral legs blackish, eight ventral and two anal legs the colour of the body.

Mines upwards in leaves of *Melica uniflora* (fig. 2 *b*), making a brownish track, which is shrivelled or puckered longitudinally, the two cuticles being visibly separated. It burrows in several leaves in succession, and sometimes two larvæ are in one leaf.

Found by Mr. Stainton early in April at Lewisham.

Pupa (fig. 2 *c*). Length 2½ lines. Light brown, curved, the back raised into a ridge, and a smaller similar elevation at each side continued onwards to the head. Affixed to the grass, previously covered with a silken web, by the anal extremity, with a silken thread thrown across the body, about or rather below the centre.

Imago (fig. 2, ♂ and ♀). A well known species frequenting ditches and moist sheltered places in May and June.

Elachista Cygnipennella, Hübner.

Larva (fig. 3 *a*). Length 4 lines. Dull greenish grey, almost destitute of hairs. Head small, yellowish brown, margined with

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very dark brown, inserted deeply into the next segment, through which it is visible in the form of two rounded lobes; on this second segment, posteriorly, are four brown spots, two on each side of a central whitish line, which extends hence down the other segments; anal segment with a small faint brownish mark; low down on the side are two dark lines along the whole length. On the upper surface are some faint indistinct depressions.

Six pectoral legs black, eight ventral and two anal legs the colour of the body.

Feeds in the leaves of *Dactylus glomeratus*, hollowing out the entire extremity, which thus becomes bleached (fig. 3 *b*).

Found by myself near Mickleham on 17th April, and by Mr. Stainton and Mr. Wing on the Croydon tram-road on 12th May.

Pupa (fig. 3 *c*). Length 3¼ lines. Whitish brown, curved, robust and obtuse in front, the back elevated into a strong ridge, at the base of which on each side is a similar but smaller lateral projection, the furrow between occupied by a dark brown line. The wing cases are marked with a curved brown line. These markings are all visible on the pupa-skin after the imago has emerged. There is no thread thrown across the body as in the two preceding species; it is held in situ upon a slight carpeting of silk by the attachment thereto of the anal segment by silken threads, aided probably by some very short stout hairs which project from the underside of the rounded anal segment.

Imago (fig. 3, ♂ and ♀). Not an uncommon species among grass in many places in June.

Note.—It will be observed that the figures of the perfect insects, as well as the preparatory states, are highly magnified, although the usual indication of the expansion of the former has been accidentally omitted on the plates.

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XXIII. *Monograph of the Genus* Cryptocerus, *belonging to the Group* Cryptoceridæ—*Family* Myrmicidæ—*Division* Hymenoptera Heterogyna. *By* F. Smith, Esq.

[Read 7th March, 1853.]

There is no genus with which we are acquainted amongst the *Formicidæ* which exhibits such eccentricities of form as are met with in *Cryptocerus;* indeed, independent of variation in general habit, the differences of the form of parts is so great in some species, that at first sight they would appear to belong to distinct genera: a careful study of a number of individuals soon shows us that these apparently broad distinctions are but modifications of one normal type of structure. Taking the type of the genus *C. atratus*, and attentively studying it, we find in the different individuals which follow, some differing in the addition to or diminution of the number of spines which usually arm the head and thorax; others having the shield of the head, or lateral produced margins, terminating more or less suddenly before reaching the posterior angles of the head; in one instance only do we find the margin continued entirely round, forming the exact model of a dish. This expansion appears to be at the expense of a diminution of other appendages, the thorax as well as the nodes of the abdomen are destitute of spines, and all other parts are of the simplest construction.

I have thought it desirable to give figures of the sexes of all the species of which I could obtain specimens for that purpose. An additional interest will arise from the discovery of the males of two species; for this valuable information we are indebted to the industry and the acuteness of observation of Mr. H. W. Bates, to whom Entomology is under such lasting obligations for the elucidation of so many points of obscurity, not the least interesting of which is the discovery of the males of *Cryptocerus*. From Mr. Bates's notes I copied the following observation: "The three sexes were taken in company in a decaying tree, in which their burrows were formed;"* judging from the number of specimens sent—two males and about a dozen of each of the other sexes—we may reasonably conclude that their societies are not very numerous. In their habits we have been informed by Lund that the species are comparatively solitary, lying in wait and springing upon their prey in the manner of a hunting spider, to which indeed they bear a striking resemblance.

* This note applies to the discovery of the sexes of *C. clypeatus*.

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The number of previously described species appears to be twenty; to this I now add fifteen, making the total thirty-five. From these I propose to remove the species of the Old World, four in number, and form a new genus for their reception; and a second new genus I create for two other species, differing very materially from all others in having the abdomen pedunculated and rounded in the females, the neuration of their wings being also quite distinct from *Cryptocerus*. When a knowledge of all the sexes shall have been obtained, it will in all probability be necessary to make further subdivisions. Indeed, I retain in the genus *Cryptocerus* a species from Adelaide with some reluctance; but having only one specimen, I leave it there for future investigation, being unwilling to destroy it by dissecting. In its antennæ I cannot detect more than ten joints, all other neuters having eleven; the basal joint of the flagellum is frequently hidden in a cavity at the apex of the scape, but such does not appear to be the case in the species from Adelaide.

Having the means of describing for the first time the male and female of a closely allied genus, the *Daceton* of Perty, I have given both descriptions and figures of the sexes; this genus, in the neuration of the wings, will be found very nearly to agree with the genus *Cryptocerus*.

I have also added to my present memoir a description of a new and allied genus from New Zealand, very remarkable for having only five joints in the antennæ of the workers.

I have much pleasure in recording still further obligations to Mr. Bates, who discovered the male and female of the genus *Daceton;* both sexes are in the collection of the British Museum. I am greatly indebted to my friend Mr. Westwood for the permission to describe four new species from his collection; nine new species are described from specimens in my own cabinet, the possession of which in the first instance induced me to undertake a monograph of the genus *Cryptocerus*.

Group CRYPTOCERIDÆ.

Genus 1. Cryptocerus.

Formica, pt. Linn. Syst. Nat. i. 965, 16; Fabr. pt. Syst. Ent. 395; Spec. Ins. i. 310; Ent. Syst. ii. 369, 54; Oliv. Encl. Méth. vi. 500; Latr. Hist. Nat. Fourm. 272.

Cryptocerus, Latr. Hist. Nat. Crust. Ins. xiii. 260; Gen. Crust. Ins. 132; Fabr. Syst. Piez. 418; Klug, Entom. Monog. 200; St. Farg. Hym. i. 170; Guérin, Icon. R. Anim. 424.

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Sexes three; female and worker furnished with a sting, sides of the head expanded, partly concealing the eyes, having on each side beneath the produced margin a longitudinal channel before the eyes; antennæ stout, clavate, reposing in the lateral channel; scape of the antennæ grooved beneath for the reception of the basal joints of the flagellum; labrum transverse, its anterior margin deeply notched; labial palpi 3-jointed, each of about equal length; maxillary palpi 5-jointed, the first joint short, subglobose, the second about the length of the two following, the apical joint the same length as the third and fourth; maxillary apical lobe somewhat rounded, slightly produced and pointed at the apex; superior wings having one marginal and two sub-marginal cells; and one small discoidal cell, sub-quadrate and narrowed towards the submarginal. Abdomen elongate in the females; ovate, or globose in the workers.

Males elongate, slender; the head not produced at the sides; ocelli prominent (smaller in the females and wanting in the workers); wings ample, neuration as in the females; legs elongate; abdomen small, attached to the thorax by two basal nodes.

Obs.—Latrielle in his Gen. Crust. et Ins. iv. p. 132, says the labial palpi consist of four joints. I have examined both labial and maxillary palpi of females and workers of *C. atratus*, under a powerful microscope, and can only detect three labial and five maxillary joints in the palpi. Fabricius, Syst. Piez., p. 419, gives labial palpi 4-jointed, maxillary palpi 6-jointed.

1. *Cryptocerus atratus.* (Pl. XIX. figs. 1, 2.)

Formica atratus, Linn. Syst. Nat. i. 965, 16; Fab. Syst. Ent. 395, 24; Spec. Ins. i. 493, 33; Mantis. Ins. i. 310, 40; Ent. Syst. ii. 363, 54; Oliv. Encycl. Méth. vi. 609; Latr. Hist. Nat. Fourm. 272, tab. xii. fig. 74 A.

Formica quadridens, De Geer, Ins. iii. 609, 7, tab. 31, fig. 17—20.

Cryptocerus marginatus, Fabr. Syst. Piez. 419, 2, ♀.

atratus, Latr. Hist. Nat. xiii. 260, tab. cii. fig. 1; Fabr. Syst. Piez. 418, 1; Klug, Entom. Monog. 200, 1; St. Farg. Hym. i. 170, 1; Guérin, Icon. R. Anim. 424, tab. 69, fig. 3; Spin. Mem. Acad. Torino. (Sér. Sec.) Tom. xii. I. 63.

Hab. Brazil; Cayenne; Surinam.

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2. *Cryptocerus dubitatus*, new sp. (Pl. XX. fig. 1.)

Male.—Length 6 lines. Head and thorax black, rugose-punctate; the stemmata placed forwards on the vertex; antennæ ferruginous. Thorax, the collar produced at the anterior angles into a short acute tooth; the metathorax is also produced at the posterior angles into a sharp spine; the wings ferruginous. Legs ferruginous, the coxæ and trochanters black. Abdomen, the two nodes black, the rest ferruginous.

This insect was in my possession some time before Mr. Bates discovered the male of *C. clypeatus*. I had placed it with "*C. atratus*" as being probably its male, but I had no other evidence of its being a male *Cryptocerus* than the circumstance of its agreeing in the neuration of the wings with that genus; from its size I still suspect it to be the male of "*atratus*." I have seen no second example.

Hab. Brazil.

3. *Cryptocerus Æthiops*, new sp. (Pl. XX. fig. 9.)

Neuter.—Length 3⅛ lines. Black, opaque, lateral margins of the head dilated, and slightly raised, within which is an indistinct longitudinal ferruginous stripe; at the posterior angles of the head are two acute spines, and in front of each eye, beneath the dilated margin, is a short tooth visible from above; at the vertex of the head are also two minute spines. At the anterior angles of the thorax is a short spine or tooth, behind which is a stout elongate spine, bidentate at the apex; the posterior angles are also armed with acute spines, which curve outwardly; the nodes of the abdomen unarmed; abdomen globose, deeply emarginate in front, the emargination receiving the posterior node, The head, thorax and nodes of the abdomen have distant large shallow punctures; abdomen very delicately shagreened, polished on the disc, and having a few scattered punctures.

Hab. Brazil.

In the Collection of the British Museum, and of my own.

4. *Cryptocerus oculatus*.

Cryptocerus oculatus, Spin. Mem. Acad. Torino, ser. 2m. tom. xii. I. 65.

Hab. Brazil.

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5. *Cryptocerus clypeatus.* (Pl. XXI. fig. 1, 2, 5 & 6.)

Cryptocerus clypeatus, Fabr. Syst. Piez. 420, 3, (worker); Perty, Delec.; Klug, Entom. Monog. 207, 6; Guérin, Icon. R. Anim. 426, 6.

Male.—Length 3½ lines. Head and thorax black, rugose, and having on the disc of the thorax a thinly scattered fulvous pubescence; antennæ and legs pale ferruginous; wings sub-hyaline, nervures pale testaceous, stigma ferruginous; a dark cloud commences just within the first sub-marginal cell, occupies the marginal one, and passes along the anterior margin to the apex of the wing. Abdomen ferrugineo-testaceous, highly polished, the first node black, the second stained at the sides.

Female.—Length 6 lines. Entirely of a reddish-yellow, smooth and shining; the flagellum of the antennæ fuscous; the lateral margins of the head raised, at the posterior angles a short acute spine, another acute spine immediately behind each posterior stemma; the anterior angles of the thorax acute; the lateral angles of the metathorax produced into stout obtuse spines, disc of the thorax somewhat flattened. Wings sub-hyaline, the nervures at the base of the wings pale, darker towards their apex; a dark cloud occupies the marginal cell and passes off along the anterior margin of the wing to the apex; the nervures of the wings have a narrow cloud running their entire length. Abdomen elongate, flattened above, having at the basal and apical angles an ovate yellow macula, surrounded by a fuscous ring.

Hab. Brazil (Santarem). H. W. Bates, Esq.

In the British Museum, and other Collections.

6. *Cryptocerus membranaceus.*

Reddish-brown, punctured; head and thorax spinose, the abdomen having a pale membranaceous margin.

Cryptocerus membranaceus, Klug, Ent. Monog.; Guérin, Icon. R. Anim. 426. (Worker.)

Length 3 lines.

Hab. Brazil.

7. *Cryptocerus quadriguttatus.*

Reddish-brown: abdomen ovate, and having four large yellow spots, and between the pairs a transverse black band.

Cryptocerus 4-guttatus, Guér. Icon. R. Anim. 425. (Worker.)

Length 3¾ lines.

Hab. Columbia; Bolivia; Amazons, Brazil.

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8. *Cryptocerus elongatus.*

Black, elongate; thorax anteriorly and posteriorly bispinose.

Cryptocerus elongatus, Klug, Entom. Monog. ♀; Guérin, Icon. R. Anim. 426.

Length 5 lines.
Hab. Brazil (Para).

9. *Cryptocerus pallens.*

Pallid, depressed; head and thorax angulate; petiole very short, sub-spinose.

Cryptocerus pallens, Klug, Ent. Monog.; Guérin, Icon. R. Anim.

Length 1½ line.
Hab. Brazil.

10. *Cryptocerus argentatus*, new sp. (Pl. XIX. fig. 7.)

Female.—Length 5 lines. Shining black: head finely and distantly punctured, rounded in front, and convex above; the stemmata placed in a triangle, wide apart; the lateral raised margins of the head narrow, commencing in front opposite the base of the mandibles, and gradually narrowing backwards to the posterior angles of the head, which are acute; prothorax acute at the anterior lateral angles, the metathorax on each side at the posterior angles forming a long spine curving slightly upwards; the first node of the abdomen produced on each side into a sharp stout spine curving upwards; the second node also has anteriorly on each side a stout acute spine curving upwards; the abdomen very smooth and shining, and having on each side, nearly touching the basal angle, an ovate yellow macula, which is sprinkled over with silvery scales or hairs; the apical segments are covered with silvery hairs; the wings fusco-hyaline, the thorax minutely and distantly punctured, the legs are sprinkled with short silvery hairs above.

Hab. Columbia.
In my own Collection.

11. *Cryptocerus D'Orbignyanus*, Westw. MSS., new sp. (Pl. XIX. fig. 5.)

Female.—Length 4 lines. Black: head and thorax covered with shallow punctures, the abdomen delicately and very closely punctured, the entire insect sprinkled with minute golden hairs; the produced lateral margins of the head rufo-testaceous an-

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teriorly, the mandibles and antennæ of the same colour. Thorax, the anterior and posterior angles acute, forming short spines; wings slightly fuscous, stigma fuscous, nervures pale testaceous; legs ferruginous. The first node of the abdomen produced in the middle laterally into a short acute spine, the second node has on each side anteriorly a recurved spine. Abdomen elongate, narrowing slightly towards the base.

Hab. South America.

Of this species I have only seen the single specimen kindly lent to me by Mr. Westwood for description.

12. *Cryptocerus quadrimaculatus.* (Pl. XIX. fig. 8.)

Black, elongate; the head convex above, rounded in front, the abdomen having four yellow maculæ.

Cryptocerus quadrimaculatus, Klug, Ent. Monog. ♀; Guérin, Icon. R. Anim. 426.

Length 3½ lines.

Hab. Brazil. In my own Collection.

13. *Cryptocerus depressus.*

Black: the head anteriorly testaceous at the sides, posteriorly bispinose; the petiole spinose.

Cryptocerus depressus, Klug, Ent. Monog.; Guérin, Icon. R. Anim. 426.

Length 2 lines.

Hab. Rio Janeiro.

14. *Cryptocerus umbraculatus.*

Rufo-testaceous, margins of the head flavescent, thorax having a spine at the anterior angles; abdomen ovate, yellow, and having two transverse black stripes connected by a central stripe.

Cryptocerus umbraculatus, Fabr. Syst. Piez. 420, 4; Klug, Entom. Monog. 210, 8; Guérin, Icon. R. Anim. 426, 8.

Length 4½ lin.

Hab. South America.

15. *Cryptocerus femoralis*, West. MSS., new sp. (Pl. XX. fig. 3.)

Neuter.—Length 2¾ lines. Black: the head, thorax and legs covered with shallow punctures, each containing a minute glittering scale or hair; the lateral margins of the head expanded before

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the eyes, the margin testaceous, the hinder angles acute; the antennæ sprinkled with glittering hairs; the sides of the thorax in front testaceous, the anterior portion transverse quadrate, behind which the sides are deeply notched, the notch containing a curved spine; the metathorax transverse, its anterior margin arched, the lateral and posterior margins curved inwards, the posterior angles produced into a sharp spine; the nodes of the abdomen transverse, armed on each side with a sharp spine which is bent backwards; legs four-sided, the section of which is a square. Abdomen somewhat heart-shaped, narrowly margined; longitudinally and finely rugulose, most strongly so at the base.

Hab. Columbia.

This species is in the Collection of J. O. Westwood, Esq., who kindly lent it me for description.

16. *Cryptocerus cordatus*, new sp. (Pl. XXI. fig. 3.)

Worker.—Length 3 lines. Black, finely punctured, thinly covered with glittering silvery scales; the head deeply emarginate in front, the sides rounded anteriorly, notched on each side over the eyes; the head truncate posteriorly, the lateral angles slightly obliquely truncate;—the head rufo-testaceous on each side anteriorly. The thorax rounded in front, produced laterally into a flattened margin, the angles of which are acute anteriorly, the sides curved and notched posteriorly, forming a small sharp tooth on each side, between which is a transverse suture; the posterior portion of the thorax is bidentate on each side, the anterior tooth being the largest, and curving slightly backwards; the basal margin of this portion of the thorax notched on each side, forming a blunt tooth in the centre. The two nodes of the abdomen are transverse, the anterior one being the widest; each is produced laterally into teeth or spines, which are bent backwards; the abdomen is heart-shaped, slightly margined at the base, the basal margins laterally testaceous.

Hab. Santarem, Brazil.

Mr. Bates, in a note on this species, observes, "Swarms of this small species, all individuals of the same size, are seen on branches and flowers of Byrsominæ and other trees on dry sandy campos."

The single specimen sent is unique in the Collection of the British Museum.

17. *Cryptocerus pusillus*. (Pl. XX. fig. 8.)

Black: head dilated before the eyes on each side, the sides anteriorly testaceous.

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Cryptocerus pusillus, Klug, Ent. Monog.; Guérin, Icon. R. Anim. 426.

Length 2½ lines.

Hab. Brazil; Demerara.

In the Collection of the British Museum, and of J. O. Westwood, Esq.

18. *Cryptocerus minutus.*

Black: head depressed, marginate, the margin pale testaceous, thorax having anteriorly on each side a bent spine; abdomen margined at the base, the margin pale testaceous.

Length 2 lines.

Hab. S. America.

Cryptocerus minutus, Fabr. Syst. Piez. 425, 5; Klug, Entom. Monog. 202, 2; Guér. Icon. R. Anim. 426, 2.

19. *Cryptocerus Pinelii.*

Dark brown: head and thorax without spines, petiole and abdomen pale yellow; the entire insect punctate.

Cryptocerus Pinelii, Guérin, Icon. R. Anim. 425.

Length 3½ lines.

Hab. Moro-Gueimado, Brazil.

20. *Cryptocerus complanatus.*

Opaque black; posterior angles of the head without spines; thorax wide in front, narrowing towards the abdomen; nodes of the abdomen transverse; spined at the sides; abdomen ovate.

Cryptocerus complanatus, Guér. Icon. R. Anim. 424 (Neuter).

Length 3¼ lines.

Hab. Cayenne.

21. *Cryptocerus Pavonii.*

Cryptocerus Pavonii, Latr. Gen. Crust. Ins. 132.

Hab. South America.

22. *Cryptocerus unimaculatus*, new sp. (Pl. XIX. fig. 9.)

Neuter.—Length 3 lines. Head and thorax black; disc of the head rugose, most deeply so on the vertex; the raised lateral margins ferruginous, terminating opposite the eyes; scape of the antennæ and the flagellum beneath ferruginous; the thorax rugose, the anterior angles produced into a stout blunt spine; the

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posterior angles have also a longer stout acute spine, the legs black; the head and thorax are both sprinkled with short bright golden hairs; each node of the abdomen has on each side an acute spine. Abdomen ovate, emarginate at the base; an oblong black stripe runs from the apex to the middle of the abdomen; beneath black.

Hab. Brazil.

This appears to be a rare species; I have only seen the single specimen in my own Collection.

23. *Cryptocerus discocephalus*, new sp. (Pl. XX. fig. 2.)

Neuter.—Length 2½ lines. Entirely ferruginous, the entire margin of the head curving upwards, forming the exact model of a dish or bowl, which has a few large scattered punctures within; the posterior angles of the head produced laterally, and bent slightly upwards; the thorax without spines, somewhat oblong-quadrate, but narrower posteriorly; nodes of the abdomen transverse, acute at their outer angles; abdomen elongate-ovate, deeply emarginate at the base; legs very short and stout.

Hab. Brazil.

Of this remarkable species I have only seen two specimens, one in the Collection at the British Museum, and one in my own.

24. *Cryptocerus causticus.*

Formica caustica, Pohl and Kollar, Braz. Insect. 17. Tab. fig. 12.

Cryptocerus caustica, Guér. Icon. R. Anim. 426.

25. *Cryptocerus elegans*, new sp. (Pl. XIX. fig. 3.)

**Neuter.*—Length 2½ lines. Head, antennæ and legs rufo-testaceous; margins of the head broadly expanded at the sides, narrowly so behind, and of a pale testaceous hue; eyes black; mandibles rufo-testaceous. Thorax elongate, rounded in front, its lateral angles produced into spines curving backwards; the metathorax has three teeth on each side; the shoulders and teeth at the sides of the thorax pale testaceous; the posterior femora testaceous, and having a minute tooth above; the first node of the abdomen rounded in front, curving outwardly at the sides to half its length, then abruptly curving inwards on each

* Mr. H. W. Bates, in a note on this species, observes:—"This pretty little species was found swimming nimbly over the broad leaves of *Heliconiæ* in a moist forest. I have not yet detected its male or female, but suppose its nest to be made in the hollow branches of trees like the other species."

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side, forming a narrow footstalk to the broad portion; the second is somewhat square, having on each side anteriorly a broad bent flattened spine. Abdomen heart-shaped, having on each side, at the base, a large ovate pale testaceous macula, and a little beyond the middle on each side a pale transverse stripe: the entire insect is covered with shallow punctures, and sprinkled with very short glittering hairs or scales.

Hab. Columbia; Brazil (Santarem). H. W. Bates, Esq.

In the Collections of the British Museum, and of J. O. Westwood, Esq.

26. *Cryptocerus hæmorrhoidalis.*

Opaque-black: the head without spines, large and nearly square, the lateral margins of the head ferruginous; abdomen ovate, the sides marginate, at the apex a large red spot, divided in the middlle by a longitudinal black line.

Formica hæmorrhoidalis, Latr. Hist. Nat. Fourm. 276.
Cryptocerus hæmorrhoidalis, St. Farg. Hym. I. 172, 3.

Length 2½ lines.
Hab. St. Domingo.

27. *Cryptocerus Araneolus*, new sp. (Pl. XIX. fig. 4.)

Neuter.—1½ lines. Dull reddish brown: the lateral margins of the head raised and expanded before the eyes; at the eyes the margins are notched, the raised margins ferruginous, the extreme apex of the antennæ pale testaceous. Thorax oblong, gradually narrowing towards the abdomen, divided in the middle by a transverse suture, the lateral margins crenulated. Legs short and stout; the nodes of the abdomen transverse, and furnished on each side with an acute spine. Abdomen ovate, marginate, and emarginate at the base; the whole insect covered with shallow punctures, each of which contains a bright golden hair.

Hab. St. Vincent's.
In the Collection of J. O. Westwood, Esq. and in my own.

28. *Cryptocerus rimosus.*

Cryptocerus rimosus, Spin. Mem. Acad. Torino, Tom. xii. I. 65.
Hab. Brazil.

29. *Cryptocerus pubescens*, new sp. (Pl. XX. fig. 4.)

Female.—Length 2 lines. Brown-ferruginous: the head laterally in front has a slightly raised margin. Thorax quadrate, the anterior margin waved, the sides curving outwardly, the

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posterior margin curving inwards and waved, notched in the middle, the four angles acute. A little before the posterior angles the sides produced into an angular tooth. The metathorax has on each side an acute spine, which as well as the first node of the abdomen is hidden by the projection of the disc; the second node half-circular or half-moon shaped. Abdomen nearly rotundate, a dark stain runs down the centre, acute at the base and gradually widening to the margin of the first segment; the entire insect is covered with erect pale hairs.

Hab. Adelaide, N. S. Wales.

In my own Collection.

Genus 2. Meranoplus.

Sexes three, male, female and worker, or neuter. *Female.*—Sides of the head not expanded; antennæ inserted before and above the eyes on each side at the base of the clypeus, the basal joint or scape nearly as long as the flagellum; in repose, received into a lateral channel or groove above the eyes in the sides of the head, passing beyond them and nearly reaching the vertex. Wings, the superior pair having one marginal and one complete sub-marginal cell, each being of about equal length; the discoidal cell sub-quadrate. Abdomen somewhat heart-shaped, attached to the thorax by two elongate nodes.

1. *Meranoplus bicolor.* (Pl. XX. fig. 6.)

Head and thorax ferruginous; abdomen black; head without spines; metathorax posteriorly armed with a long acute spine on each side.

Cryptocerus bicolor, Guérin, Icon. R. Anim. 425.

Length $1\frac{3}{4}$ lines.

Hab. Pondicherry.

2. *Meranoplus petiolatus*, new sp. (Pl. XX. fig. 7.)

Female.—Length $3\frac{1}{2}$ lines. Head bright ferruginous; antennæ dark rufo-testaceous; the thorax of the same colour, longitudinally rugose, the lateral margins of the thorax parallel to the base of the wings, from whence the sides are narrowed considerably to the metathorax, which on each side has a short tooth; wings pale, nervures pale ferruginous; legs ferruginous; the nodes of the abdomen sub-quadrate; abdomen ovate, rufo-testaceous, and irregularly stained with black; beneath black, and having a large rufous patch in the middle, which has a black stain in the centre; the entire insect has a thinly scattered erect pale pubescence.

Hab. Brazil.

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A rare species apparently. I have only seen the single specimen in my own Collection.

Genus Cataulacus, new gen.

Sexes three, male, female and neuter, or worker. *Female.*—The sides of the head not expanded, the eyes not concealed. Antennæ inserted before the eyes; in repose, received into an oblique groove or channel in the cheek; scape of the antennæ grooved beneath for the reception of the basal portion of the flagellum. Wings having one marginal and one complete sub-marginal cell, the discoidal cells obsolete. Abdomen elongate in the female, ovate in the workers or neuters.

Male not known.

1. *Cataulacus Taprobanæ*, Westw. MSS., new sp. (Pl. XX. fig. 10.)

Neuter.—Length 2 lines. Black: the head and thorax roughly longitudinally rugose, the vertex behind, and a small central portion of the thorax, anteriorly transversely rugose; the antennæ rufo-testaceous, the scape and extreme apex pale; sides of the head and thorax crenulated, the posterior angles of the latter armed with a stout spine; the tibiæ and tarsi rufo-testaceous. The nodes of the abdomen coarsely sculptured; abdomen ovate, finely shagreened, and longitudinally and delicately rugose at the base and sides, the rugosity consisting of a series of raised striæ which do not reach the middle of the abdomen excepting at the sides.

Hab. Ceylon.

This species is unique in the Collection of the Entomological Society, to which it was presented by Mr. G. H. K. Thwaites, who captured it in Ceylon.

2. *Cataulacus Guineensis*, Westw. MSS., new sp. (Pl. XX. fig. 5.)

Neuter.—Length 2¾ lines. Black: head and thorax longitudinally rugose-striate, most deep and coarse on the thorax; sides of the head crenulate, the scape ferruginous, apical joint of the flagellum testaceous, the palpi testaceous. Thorax, the anterior portion transverse and inclining downwards towards the head, the sides crenulate, the posterior angles acute; behind the transverse portion the thorax becomes much narrower towards the metathorax, from which it is separated by a transverse deep suture;

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posterior angles of the metathorax produced into an elongate stout acute spine; the tibiæ and tarsi ferruginous. Abdomen ovate, finely granulate, the nodes deeply and coarsely sculptured; the entire insect is sprinkled with erect pubescence.

Hab. Tropical Western Africa.

Unique in the Collection of J. O. Westwood, Esq., who kindly lent it to me for description.

3. *Cataulacus parallelus*, new sp. (Pl. XIX. fig. 6.)

Female.—Length 3½ lines. Black: the head longitudinally rugose-striate, the vertex emarginate, the emargination transversely rugose-striate; the scape of the antennæ and extreme apex of the flagellum ferruginous. Thorax longitudinally rugose-striate; the metathorax on each side produced into a stout sharp bent spine, beneath which it is transversely sulcate; wings tinged with yellow, their nervures pale testaceous; the tibiæ and tarsi ferruginous. The first node of the abdomen coarsely sculptured transversely, the second longitudinally so. Abdomen oblong-quadrate, finely aciculate at the base, beyond which it is delicately shagreened, and has towards the apex a few short scattered pale setæ.

Hab. Cape of Good Hope.

Apparently a rare species; I have only seen the specimen in my own Collection.

4. *Cataulacus granulatus*.

Formica granulata, Latr. Hist. Nat. Fourm. 275, tab. 12, fig. 75.
Cryptocerus granulatus, St. Farg. Hymenop. I. 171, 2.

Opaque-black, granulated, the posterior angles of the head armed with a spine, sides of the head not produced, the eyes exposed.

Length 1⅞ lines.

Hab. India.

Genus 3. Daceton.

Formica, pt. Latr. Hist. Nat. des Fourm.
Daceton, Perty, Delect. An. Art.

Sp. 1. *Daceton armigerum*. (Pl. XXI. figs. 1, 2.)

Formica armigera, Latr. Hist. Nat. Fourm. 244, tab. ix. fig. 58 (neuter).
Atta? *armigera*, Guér. Icon. R. Anim. 221, tab. 69, fig. 2.
Daceton armigerum, Perty, Delect. An. Art. Bras. tab.

Female.—Pale rufo-testaceous, head heart-shaped, ocelli placed in a triangle on the vertex; thorax not quite so wide as the head,

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the anterior angles produced into short acute spines, the posterior angles armed with short stout obtuse spines; anterior wings having one elongate marginal cell nearly reaching the apex of the wing, and of nearly equal width throughout, truncate at the apex, one marginal cell complete, and one discoidal cell; nodes of the abdomen without spines; abdomen ovate, pointed at the apex.

Male.—Length 5 lines. Head and thorax black; on the sides of the head and face a little scattered hoary pubescence, the vertex roughly sculptured longitudinally; the antennæ and mouth rufo-testaceous, the former as long as the entire insect. Thorax above having a few long scattered griseous hairs; the mesothorax has in front a narrow abbreviated smooth oblong space, a similar smooth line is also observable parallel with the tegulæ; the post-scutellum is pale testaceous, wings sub-hyaline, the nervures thick and of a pale testaceous colour, the marginal cell is occupied by a fuscous cloud. Legs pale rufo-testaceous; the nodes of the abdomen fuscous as well as the sides of the following segment, the rest of the abdomen ferruginous.

Hab. Brazil (Santarem). Mr. H. W. Bates.

The male and female in the British Museum, the latter also in my own Collection.

The male and female were captured by Mr. Bates, who says:—"This species I always find wandering about the trunks of large trees, not in numerous bands, following in regular order, but only a few scattered individuals, apparently wandering each on his own account in pursuit of prey. When observed, they are seen to carry their mandibles wide open at right angles to the axis of their bodies; and when a stalk of grass or any other article is presented at their heads, they close their jaws with a sudden snap. I do not know where or how they construct their nests. I have never seen it occupied in any regular industry, or associated in great numbers like *Œcodoma cephalotes*, to which it appears to be allied."

Genus 4. Orectognathus, new gen.

Head heart-shaped; eyes prominent, placed forwards on the sides of the head; mandibles elongate, projecting forwards in a line with the body; antennæ elongate, inserted near the base of the mandibles, 5-jointed in the worker. Thorax narrow, a little longer than the head; abdomen attached to the thorax by two narrow elongate ovate nodes.

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Sp. 1. *Orectognathus antennatus*. (Pl. XXI. fig. 9.)

Neuter.—Pale rufo-testaceous, the mandibles armed at their extremity with two long spines or teeth, the upper one simple, the lower one forked at the apex; the anterior angles of the thorax have a short acute spine, a second short one is situated about the middle at the sides, and the metathorax is armed with two longer slender acute spines; legs elongate, very pale testaceous. Abdomen nearly rotundate, slightly flattened, the first node elongate-clavate, the second globose.

Hab. New Zealand.

In the Collection of the British Museum.

EXPLANATION OF PLATES.

PLATE XIX.

Fig. 1. *Cryptocerus atratus* ♀; 1 *a*, labium of do.; 1 *b*, maxilla of do.; 1 *c*, labrum of do.; 1 *d*, mandible of do.; 1 *e*, labium of do. (neuter); 1 *f*, maxilla of do. (neuter).
2. *atratus* (neuter).
3. *elegans*; 3 *a*, antenna of do.
4. *Araneolus*.
5. *D'Orbignyanus*.
6. *Cataulacus parallelus*; 6 *a*, front view of the head of do.
7. *Cryptocerus argentatus*; 7 *a*, antenna of do.
8. *quadrimaculatus*.
9. *unimaculatus*.

PLATE XX.

Fig. 1. *Cryptocerus dubitatus*.
2. *discocephalus*.
3. *femoralis*.
4. *pubescens*; 4 *a*, antenna of do.
5. *Cataulacus Guineensis*; 5 *a*, underside of the head, showing the grooves for the reception of the antennæ.
6. *Meranoplus bicolor*; 6 *a*, antenna of do.
7. *petiolatus*; 7 *a*, antenna of do.
8. *Cryptocerus pusillus*; 8 *a*, antenna of do.
9. *Æthiops*.
10. *Cataulacus Taprobanæ*.

PLATE XXI.

Fig. 1. *Cryptocerus clypeatus*, ♀.
2. do. do. ♂.
3. *cordatus*.
4. *membranaceus*.
5. Head of *C. clypeatus* (neuter).
6. Thorax of do.
7. *Daceton armigerum*, ♂.
8. do. do. ♀.
9. *Orectognathus antennatus* (neuter); 9 *a*, mandible of do.; 9 *b*, antenna of do.; 9 *c*, metathorax of do.

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XXIV. *A Revision of the Synonymy of the British Species of the Coleopterous Genera* Hydrochus *and* Ochthebius. *By* G. R. Waterhouse, Esq., F.Z.S.

[Read 4th April, 1853.]

The acquisition of Mr. Stephens's Collection by the British Museum, where the specimens may always be examined, has furnished a favourable opportunity to British Entomologists to clear up the synonomy of the insects of their own country, since that Collection is, on the whole, the most perfect that has hitherto been formed, and contains the types of the species described by its late owner, as well as the types described by Marsham. Furthermore, the general Collection of the British Museum possesses specimens of European species, forwarded, with names, from various parts of the Continent, and hence these continental specimens can be compared with the British.

A short time since I determined to re-examine some of the groups of small *Coleoptera* of my own English Collection, and to determine, if possible, the nomenclature of the species, according to the French and German Entomologists, taking Gyllenhal, Erichson and Mulsant as my chief guides.

I have now completed the examination of the species of *Ochthebius*, *Hydræna*, *Hydrochus*, and *Cercyon*, and I believe I have satisfactorily determined the species of these genera, so far as the authors above mentioned are concerned; and with regard to the genera *Ochthebius* and *Hydrochus*, I have also examined the species of Mr. Stephens's Collection, and have prepared a list of the species to lay before the Society this evening. The other genera I propose to bring before your notice upon an early occasion.

As regards the genus *Hydrochus* little need be said. I have long imagined we had but two species in England,—I had but two species in my own Collection, and upon examining a specimen, or specimens, in Mr. Stephens's Collection, of the third species, I could perceive no points of distinction. This I now find is easily explained. We have in fact three British species, viz.:—

1. *Hydrochus brevis*, of German, French, and English authors.
2. *Hydrochus elongatus*, also of Continental and English authors; but Mr. Stephens I find has, under this name,

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specimens of the true *elongatus* mixed with others of *H. angustatus*.

3. *Hydrochus angustatus*, Müller, Germar, Mulsant, Stephens.—More commonly known on the Continent by the name of *H. crenatus*, it being generally supposed to be the *Elophorus crenatus* of Fabricius; but Erichson has discovered that the Fabrician insect is the *Latridius porcatus*.

H. Brevis is at once known by its short form. *H. elongatus* and *angustatus* have nearly the same form, but may be distinguished—*H. elongatus* by the alternate interstices of the striæ of the elytra being carinated, and *H. angustatus* by the interstices being even, or very nearly so. *H. elongatus* is common in the fens of Whittlesea Mere, and, I believe, is not found in the London district. *H. angustatus* is very common in ponds and ditches in the neighbourhood of London.

The British species of *Ochthebius* which have come under my notice are:—

1. *Ochthebius marinus*, of Stephens as well as the German and French authors.

2. *Ochthebius æneus*, Waterhouse, Stephens.

I am satisfied this is a good species, but I do not find it described by the continental Entomologists. It approaches most nearly to *O. marinus* and *O. pygmæus*. From either it may be distinguished by its broader form and peculiar colouring, as well as by the striæ of the elytra being more delicately punctured, more widely separated, and the punctures less closely packed together. From *O. marinus* it moreover differs in wanting the two transverse impressions on the thorax, and the disc of the thorax being distinctly punctured; that these punctures are much scattered, and consequently not very numerous, furnishes another point of distinction when *O. æneus* is compared with *O. pygmæus*, which has the thorax thickly and comparatively strongly punctured. The head is black, tinted with green, and so is the thorax, but the lateral margins are testaceous yellow; the elytra are testaceous yellow, with a golden æneous tinge usually, but sometimes without the metallic colour. The suture is brownish or dusky. I took this species many years back in the ponds of Putney Heath in the month of May.

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3. *Ochthebius margipallens*, Latreille and Mulsant.
pusillus, Waterhouse, Stephens.

4. *Ochthebius pygmæus*, of Stephens and Continental authors.

5. *Ochthebius bicolon*, Stephens and Continental authors.

6. *Ochthebius rufo-marginatus*, Stephens.

This I regard as a good species. Mulsant gives *rufimarginatus* as a synonym with *O. bicolon*, but I suspect he is not acquainted with our species, and has supposed certain varieties of *O. bicolon*, in which the sides of the thorax are reddish, to be Mr. Stephens's species. The present species is shorter, more convex, and has the elytra more deeply punctate-striated than *O. bicolon*.

7. *Ochthebius exaratus*, Mulsant.

8. *Ochthebius æratus*, Stephens.
nanus, Stephens.
pellucidus, Mulsant.

Stephens's *O. nanus* appears to me to be clearly a small black variety of his *O. æratus*, which is undoubtedly the same as Mulsant's *O. pellucidus*. I may further remark that the *O. hibernicus* of Stephens's Collection is the same, but the *O. hibernicus* of Curtis appears to be the next species.

9. *Ochthebius punctatus*, Stephens and Continental authors.
hibernicus, Curtis.

10. *Ochthebius exculptus*, Sturm.
Enicocerus viridicæneus, Steph. (♂).
Gibsoni, Curtis (♀).
tristis, Curtis.

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XXV. *Descriptions of some new Species of* Coleoptera *from China and Ceylon.* *By* J. O. Westwood, Esq., F.L.S., &c.

[Read 4th April, 1853.]

At the request of Major Champion I have drawn up descriptions of several of the more curious and interesting species of *Coleoptera* collected by himself during his residence in Ceylon and Hong Kong; and, as the chief of these belong to the division of the *Serricornes* of Latrielle, I have added descriptions of two other closely allied species from Ceylon and New Holland, in the collections of Dr. Templeton and W. W. Saunders, Esq. As Major Champion's Chinese collection was formed, for the most part, by himself whilst in company with our indefatigable Corresponding Member, J. C. Bowring, Esq., I also take the present opportunity of publishing some Notes on the Habits of a few of the *Coleoptera* of Hong Kong, which Mr. Bowring has been so kind as to forward to me. These notes relate to the *Cicindelidæ*, *Carabidæ*, and a species of *Sisyphus* which Mr. A. White has named *S. Bowringii*, and are as follow:—

"The *Cicindelidæ* of Hong Kong, comprising as far as I have observed, some eight or nine species, appear to vary considerably in their habits; some frequenting trees and shrubs; others, like our English species, delighting in hot sandy places, rising, when disturbed, and after flying a short distance settling again in front of the intruder, continuing thus for a considerable time, while one at least would appear to move about at night. The species last alluded to is a remarkably elegant insect, closely allied to *C. Gyllenhalii*, the male being distinguished by a large metallic plate on each elytron, and is very rare, as during a residence of six years in China I have met with but a single pair; the female flew into my room at night, in the spring of 1842, and the male was taken in the early part of the present year, at dusk. Its nocturnal habits will no doubt account for its coming so seldom under notice. A fine species, forwarded by me to England in 1844, and described by Mr. White under the name of *C.* (*Heptodonta*) *posticalis*, is very common in Hong Kong during the summer months. In its great length of legs and cylindrical form it resembles *Tricondyla*, and its custom of constantly resorting to trees and shrubs, when disturbed, likewise brings that genus to our minds. *Heptodonta Cantori* (Hope), a closely allied species

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forwarded from Canton by Dr. Cantor, is doubtless similar in its habits, but I have not had an opportunity of observing it alive. *Calochira aurulenta* is also a very common species, and may frequently be seen assembled in considerable numbers about the pabulum of cattle, lying in wait apparently for other insects which are attracted to the spot. It is less active than most *Cicindelæ*, and is easily captured. Besides the above, the present collection contains specimens of two *Cicindelæ* as yet I believe undescribed. They are named provisionally in my journal *Cic. lineata* and *Cic. marmorata*. The latter is remarkable for its close resemblance to an African insect, *Cic. Senegalensis*, the markings of the elytra being precisely similar. It is however to be distinguished by the greater length of its tibiæ and tarsi. A third species, which I had named *C. sex-punctata*, is apparently identical with *C. triguttata* from the Philippine Islands.

"*Tricondyla pulchripes*, which is not uncommon, frequents the Lichi tree (Dimocarpus Lichi), up and down the trunk and branches of which it courses with surprising agility in search of its prey. As might be expected from its large and prominent eyes, it is very vigilant, darting round to the opposite side of the trunk on the approach of an intruder, and ascending out of reach in a very short space of time. When hard pressed they fall to the ground and disappear among the dried leaves which cover the soil.

"A species of *Colliuris*, near *longicollis*, may not unfrequently be seen on flowers and shrubs along the margin of streams, but as it immediately takes flight when approached, and is very active, it is captured with difficulty.

"Many *Brachinidæ* are to be met with in Hong Kong; and during the last year or two I have come across several new and conspicuous species. *Helluo* (*Acanthogenius*) *astericus*, which is found under large stones on a clay soil, was rather plentiful during the past spring, being frequently in company with *Macrocheilus Bensoni*, which is a common insect. I first observed *H. astericus* in 1844, and did not again fall in with it until the present year. Shortly before my departure from Hong Kong I took a fine series of a new species of *Brachinus* of large size, *Brach. lugubris*, found in small societies under stones on the highest peaks of the island. They appear to affect the most elevated spots, and are plentiful under the piles erected during the ordnance survey of Hong Kong. This insect crepitates with considerable power, firing off several discharges with great rapidity, the volatile liquid burning

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the hands and staining them in such a manner that the marks remain for many days.

"I have observed a singular point in the habits of the *Sisyphus*, to which Mr. White has done me the honour of affixing my name, viz. that both the male and female assist in *making* the balls of dung in which the egg is deposited, having taken many specimens during the present spring each with a pellet of dung between the middle and hind legs, which they are most unwilling to relinquish. This was before they commenced rolling the balls along to the holes they had previously dug."

Family CEBRIONIDÆ.

Genus Callirhipis, Latr., Guérin.

The species of this genus inhabiting the eastern hemisphere differ from those in America in being less elongated, with the head longer; the pronotum subtriangular and widened behind, and with the elytra only moderately convex. The species hitherto described from the former part of the world are—

1. *C. Dejeanii*, Latr. Amboyna and Java.
2. *C. Javanica*, Laporte. Java.
3. *C. orientalis*, Laporte. Java. (Male of No. 2?). And
4. *C. ruficornis*, G. R. Gray, An. K. Ins. pl. 39, fig. 2. New Holland.

Two additional species from Ceylon (of which I have only hitherto seen unique specimens) are now added.

5. *Callirhipis Templetonii*, Westw. (Pl. XII. fig. 4.)

Fusco-nigra, luteo-sericans, capite et pronoto sub lente fere impunctatis, elytris opacis, punctis majoribus lineisque nonnullis subelevatis; antennis brunneis in mare longissime ramosis, pronoto subtrigono, postice supra subplano, utrinque impressionibus tribus in triangulum dispositis. (Mas.)

Long. corp. lin. 8.

Habitat in insula Taprobana. Mus. Templeton.

Caput parvum, subtriangulare. Clypeus deflexus, vertex antice parum excavatus. Palpi fulvi. Antennæ brunneæ, articulo 1mo nigro, articulis 3—10 singulatim ramum longissimum emittenti, ramo antico elytris e tertia parte breviori, articulo 11mo longitudine dimidii elytrorum. Prothorax subconicus, antice gibbus, postice fere planus et utrinque impressionibus tribus parum profundis notatus, disco sub lente punctatissimo.

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Elytra opaca, subvelutina, ad basin latitudine basi pronoti æqualia, irregulariter punctata, intus humeros depressa, sutura lineisque quatuor longitudinalibus in singulo paullo elevatis subnitidis, 2da et 4ta postice conjuncta. Pedes piceo-fusci villosi. Corpus infra piceo-fuscum, villosum, membrana inter caput et prothoracem utrinque spina parva cornea obtusa plana armata; abdominis segmento 2do plaga media rotunda, 3tioque altera minori ovali transversa, setosa, notatis.

This species appears to differ from the following in the much less strongly punctured surface of the body, and the velvet-like coating of the elytra.

Callirhipis Championii, Westw. (Pl. XII. fig. 2.)

C. piceo-nigra, elytris magis castaneis, subnitidus punctatissimus, capite carina elevata inter antennas, clypeo verticeque antice concavis; antennis (articulis 2dis basalibus exceptis) brunneis, pronoto subtrigono, postice subplano utrinque impressionibus tribus in triangulum dispositis. (Fem.?)

Long. corp. lin. 9.

Habitat in insula Taprobana. Major Champion.

Caput nigrum, subnitidum, rude punctatissimum, ante oculos fere in rostrum angustum productum, vertico antice concavo, margine elevato et inter antennas carinam obtusam transversam formante, postice longitudinaliter impresso; clypeoque minus concavo. Labrum parvum, subtectum, antice rotundatum, setosum. Mandibulæ breves crassæ, apice acute falcatæ denteque parvo acuto in medio marginis interni armatæ. Maxillæ lobis duobus parvis angustis equalibus setosis terminatæ; palpi maxillares mediocres, satis crassi, articulo terminali subconico. Antennæ in individuo unico viso breves (longitudine latitudinem partis posticæ pronoti æquanti); articulis 3—10 laminam elongatam (singula circiter dimidium longitudinis totius antennæ æquali), articulis duobus basalibus nigris nitidis punctatis; reliquis brunneis velutinis, ultimo elongato laminato. Pronotum subtrigonum, antice convexum et declive, postice subplanum punctis minutis impressum, utrinque etiam impressionibus tribus rotundatis parum distinctis in triangulum dispositis. Elytra piceo-castanea, minute punctatissima, basi læviori intus humeros haud profunde impressa, singulo lineis quatuor elevatis longitudinalibus basin et apicem elytrorum haud attingentibus;

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secunda et quarta (e sutura) postice conjunctis. Pedes et corpus infra piceo-nigra, subnitida, punctatissima, punctis minimis et magis approximatis. Oviductus? exsertus, acutus, corneus, apice bifidus.

Taken by Major Champion under a log of wood, at Galle, August 19th, 1846.

Pl. XII. fig. 2, Insectum magnitudine parum auctum; 2*a*, caput supra visum; 2*b*, idem a latere; 2*c*, labrum; 2*d*, mandibulæ; 2*e*, maxilla biloba; 2*f*, instrumenta labialia.

Genus Rhipicera, Latr.

(*Polytomus*, Dalm.; *Ptiocerus*, Hoffm.)

We have here another interesting genus of which the species are natives both of Australia and the New World; those however which inhabit New Holland have been formed by M. Guérin Meneville, in his Monograph of the genus, (Sp. et Icon. Anim. Artic. pl. 1,) into two sections, apart from those of America. They are—

S-G. Agathorhipis, with the body elongate, the branches of the antennæ of the males large, and the tarsi with subelongated joints, the last joint of the maxillary palpi truncated, and the lamellæ of the basal joint of the tarsi much smaller than those of the three following joints.

1. *R. femorata*, Kirby (*mystacina*, Latr.) New Holland; Van Diemen's Land.
2. *R. Reichei*, Guér. Men. Swan River.
3. *R. mystacina*, Fab. New Holland.
4. *R. Drurii*, Westw. (*mystacina*, Drury). Sierra Leone??
5. *R. attenuata*, Westw. Swan River.
6. *R. pumilio*, Westw. Swan River.

S-G. Oligorhipis, Guér. Men., with the body short and thick, the branches of the antennæ of the male moderate, and the tarsi thick and dilated.

7. *R. vetusta*, Gory in Icon. R. An. Ins. texte, p. 44. (*R. brunnea*, Westw.) New Holland. (Antennæ 18-articulatæ.)
8. *R.* (*Oligorhipis*) *tessellata*, W. W. Saunders. (Pl. XII. fig. 1.)

R. nigra, sub lente punctatissima, dense at irregulariter albido-setosa; prothorace 4-impresso, elytris castaneis punctatis albido-sericeo-maculatis lineisque elevatis obliquis notatis. (Fem.)

Long. corp. lin. 11.

Habitat in Australasia. In Mus. W. W. Saunders.

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Corpus crassum, punctatissimum, albido dense setosum et inde opacum. *Caput* triangulare, vertice antice bilobo. *Mandibulæ* falcatæ acutæ, dente parvo in medio marginis interni armatæ. *Antennæ* breves, piceæ, 17-articulatæ, articulis 4—16 intus sensim acute productis, articulis terminalibus longius productis. *Prothorax* convexus, angulis anticis obtusis, posticis acutis, disco in medio linea tenui longitudinali, impressionibusque duabus utrinque (postica majori et ovali) impresso. *Scutellum* rotundatum, albo-setosum. *Elytra* valde convexa, prothorace multo latiora, obscure castanea, sub lente punctatissima, maculisque numerosis irregularibus albo-setosis ornata, singulo lineis 5 elevatis subnitidis lævibus obliquis notato, 1ma prope medium suturæ evanescenti, reliquis inter se versus apicem elytrorum conjunctis. *Corpus* infra cum pedibus nigrum, griseo-albido setosum.

Pl. XII. fig. 1, Insectum magnitudine paullo auctum; 1 *a*, antenna; 1 *b*, mandibula; 1 *c*, 1 *d*, tarsus, supra et a latere visus.

Fam. ELATERIDÆ.

Genus Lichas, *Westw.*

Corpus oblongo-ovale, sub-convexum, setosum, minus rigidum quam in *Elateridis* genuinis. *Caput* antice planum, ad oculos in excavatione antica prothoracica receptum; angulis anticis elevatis et rotundatis; antennis sub partes elevatas ante oculos insertis; clypeo et labro cum lateribus mandibularum detectis, rostrum breve planum formantibus. *Labrum* planum, latitudine longitudinem ejus paulo superanti; setosum, angulis anticis rotundatis margine antico submembranaceo et parum emarginato. *Mandibulæ* parvæ corneæ, apice falcatæ, et oblique truncatæ, basi intus dilatato. *Maxillæ* inermes, longe setosæ bilobæ, lobo externo sub biarticulato, apice lato obliquo. *Palpi* maxillares articulo basali minuto, 2do et 3tio subæqualibus, 4to paullo latiori compresso, apice suboblique truncato. *Mentum* planum, subsemicirculare, setosum. *Labium* cordato-truncatum. *Palpi* labiales breves, 3-articulati, in scapum articulum simulantem, insidentes, articulo ultimo paullo majori et subsecuriformi. *Oculi* magni, globosi. *Antennæ* latitudine capitis fere triplo longiores, liberæ, articulis compressis subserratis; ultimo præcedenti paullo latiori subovali. *Prothorax* latior quam longus, subconicus, angulis posticis lateribus acutis et paullo reflexis; lateribus subtus canaliculatis; prosternum pone coxas anticas acute retro

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porrectum, et in cavitate parva mesosterni receptum. *Scutellum* parvum, fere rotundatum. *Elytra* oblongo-ovalia, subconvexa, sub lente punctulatissima, luteo-setosa, spatiis multis irregularibus maculiformibus nudis. *Pedes* graciles, satis elongati, simplices, setosi, calcaribus minutis 2, 2, 2. *Tarsi* simplices, articulis 4 basalibus subtus spongiosis setosis. *Ungues* simplices, longi acuti, pseudonychia unica setosa instructi.

Notwithstanding the very dissimilar facies of the type of this genus to those of the family *Elateridæ*, the absence of the prosternal grooves for the reception of the antennæ, the far less rigid texture of the body, and the comparatively shorter development of the prosternal mucro, I refer this remarkable insect to the last-named family, although in several of these respects it bears a much greater analogy to such genera as *Atopa* and *Cebrio*. The style of colouring is very peculiar, and has suggested the specific name.

Lichas funebris, Westw. (Plate XII. fig. 3.)

Nigra, nitida, sub lente punctatissima, cinereo-setosa; elytrorum punctulis in lineas nonnullas versus suturam alterasque paucas discoidales distantes dispositis, maculisque numerosis irregularibus discoidalibus setarum nudis notatis; corpore infra nigro, cinereo-setoso, abdomine magis piceo, lateribus nigro-submaculatis.

Long. corp. lin. 10—12.

Habitat in China, prope Hong Kong.

In Mus. nostr. Communicavit D. Champion.

Major Champion informs me that his specimens of this insect were captured by Mr. Killeff, on *Camellia assimilis*, Champ., in the month of June, at Hong Kong and Victoria Peak.

Pl. XII. fig. 3. Insectum vix auctum; 3*a*, caput supra visum; 3*b*, labrum et mandibulæ; 3*c*, maxilla; 3*d*, instrumenta labialia; 3*e*, tarsus; 3*f*, ungues cum pseudonychia; 3*g*, corpus subtus visum.

Fam. TELEPHORIDÆ.

Genus Eugebusis, *Westw.*

Corpus parvum, oblongum, supra depressum, coriaceum, punctatum, setulosum. *Caput* magnitudinis ordinariæ, margine antico pronoti haud occultatum. *Oculi* mediocres. *Labrum* parvum, angulis anticis rotundatis. *Mandibulæ* parvæ, falcatæ, acutæ. *Maxillæ* minutæ, submembranaceæ, lobo parvo ob-

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longo inermi. *Palpi* maxillares 4-articulati, articulo ultimo maximo oblongo plano, apice rotundato setoso. *Mentum* parvum, subquadratum? *Labium* apice oblique rotundatum. *Palpi* labiales 3-articulati, articulo ultimo maximo oblongo, plano setoso, apice oblique rotundato. *Antennæ* graciles, longitudine elytrorum 11-articulatæ, articulis 3—10 ramum tenuem elongatum setosum singulatim emittentibus; ultimo elongato. *Prothorax* transversus, antice attenuatus, marginibus lateralibus ante angulum posticum subemarginatis, angulis acutis. *Elytra* oblonga, depressa, fere parallela, apice sensim rotundata, dorso lineis elevatis notata. *Pedes* graciles, simplices, tarsorum articulo penultimo parvo bilobo.

The immense development of the palpi of the type of this genus, together with its exposed head and branched antennæ, give it quite a peculiar character. I have, however, seen but a single specimen, evidently a male; and can, therefore, only conjecture that the female will possess simple palpi and antennæ, in which case it will bear considerable resemblance to the group of *Telephoridæ* named *Silis*. It appears also to possess a certain relation to *Amydetes* in the texture of the elytra, and their raised longitudinal lines.

Eugeusis palpator, Westw. (Plate XII. fig. 5.)

E. rufo-fulva, opaca, punctata, fulvo-setosa; antennis, palpis et dimidio apicali elytrorum nigris.

Long. corp. lin. 3.

Habitat in insula Taprobanæ. Major Champion.

Corpus fulvum, parum molle, dorso magis coriaceo. Caput subquadratum, supra planum, vel parum concavum, punctatum, inter antennas transverse elevatum; clypeo parvo, transverso, depresso. Oculi mediocres, prominuli, nigri. Labrum parvum, margine antico paullo curvato setoso. Mandibulæ elongatæ, graciles, falcatæ, acutæ, nigræ. Maxillæ lobo parvo unico terminali. Palpi maxillares et labiales picei, velutini, compressi, articulo ultimo elongato-spatulato. Antennæ piceæ, longitudine elytrorum articulorum basalium apicibus rufo-piceis, articulis 3—10 ramum (articulo dimidio longiorem) setosum emittentibus. Prothorax latior quam longus, postice latior, lateribus rotundatis, versus basin utrinque paullo incisus, angulis posticis prominulis; margine postico paullo sinuato, depresso, disco subdepresso linea tenui media longitudinali punctisque minutissimis numerosissimis impresso. Scutellum apice rotundatum. Elytra punctatissima,

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singulo lineis quatuor longitudinalibus gracilibus parum elevatis, fulva, dimidio apicali nigro, sutura et lateribus tenuiter fulvis. Corpus infra pallide fulvum. Pedes fulvi, femoribus supra articuloque 4to tarsorum fuscis.

Taken by Major Champion at Narrawille, near Galle, in Ceylon, in the month of August, 1846.

Pl. XII. fig. 5, Insectum valde auctum; 5 *a*, caput antice visum; 5 *b*, mandibulæ et labrum; 5 *c*, maxilla; 5 *d*, labium et palpi labiales; 5 *e*, tarsus.

Fam. LONGICORNES.

Genus Clytellus, *Westw.*

Corpus parvum, convexum, medio valde constrictum. *Caput* parvum verticale, partibus oris parvis. *Labrum* breve transversum, angulis anticis rotundatis ciliatis. *Mandibulæ* parvæ subtriangulares, apice acutæ. *Maxillæ* minutæ, basi extus elongatæ bilobæ, lobo externo apice latiori integro longe ciliato. *Palpi* maxillares minuti, articulis 3bus basalibus brevibus; ultimo magno obconico, apice recte truncato. *Mentum* breve transversum, margine antico in medio parum rotundato, angulis anticis lateralibus extus productis. *Labium* breve, profunde emarginatum. *Palpi* labiales maxillaribus magnitudine et forma similes. *Antennæ* corpore paullo breviores tenues, 11-articulatæ, simplices. *Oculi* parvi, rotundati, integri. *Prothorax* elongatus, convexus, antice capitis latitudine, lateribus inermibus paullo rotundatis, versus partem posticam profunde constrictus. *Elytra* brevia, valde convexa, ante medium parum constricta, pone medium paullo dilatata et inflata, versus basin scabro et tuberculis duobus acutis reflexis instructa. *Pedes* longi, femoribus pone medium incrassatis. *Tibiæ* et tarsi simplices.

The curious little *Longicorn* beetle, which is the type of this genus, has more the appearance of an ant or female *Methoca* than that of a Coleopterous insect. It appears to be the Eastern representative of the *Enoplophoræ* of the New World.

Clytellus methocoides. (Plate XII. fig. 6.)

C. cyaneo-niger, pronoto striato-punctato, elytris basi carneo-castaneis rude oblongo-punctatis, ultra basin glaberrimis nigro-cyaneis nitidissimis lævibus, apicibus albo-hirtis.

Long. corp. lin. 2 vel 3.

Habitat prope Hong Kong, China. Major Champion.

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Caput breve, transversum, facie sub antennas verticale tenuissime punctata, subtus semicirculariter terminata, clypeo et mandibulis brevibus crassis semicirculo inclusis, labro minuto ciliato. Antennæ fere longitudine corporis, graciles simplices nigræ. Prothorax elongatus, prope basin valde constrictus, parte antica ovata valde gibbosa, punctis elongatis seu striolis gracilibus numerosis impressus, griseo parum setosus; parte pone constrictionem brevi subannuliformi transversim elevata. Elytra capite et prothorace paullo longiora; basi prothoracis partis latioris latitudine, in medio sensim dilatata ovata, valde convexa glaberrima, basi carneo-castanea rude oblongo-punctata singuloque tuberculo magno elevato apice acuto reflexo, instructo, ultra basin punctatam ovalia, valde convexa glaberrima cyaneo-nigra, impunctata, apicibus albo-setosis. Pedes cyaneo-nigri. Corpus infra nigrum, pectore pube grisea dense vestito.

Taken by Major Champion on *Eryobotria Chinensis*, Champ., on Victoria Peak, near Hong Kong, April 6th, 1849.

Pl. XII. fig. 6, Insectum valde auctum; 6*a*, idem a latere visum; 6*b*, labrum; 6*c*, mandibula; 6*d*, maxilla; 6*e*, instrumenta labialia.

XXVI. *On the Insects used for Food by the Indians of the Amazon.* *By* A. R. Wallace, Esq.

[Read 6th June, 1853.]

Annulose animals have found little favour as articles of food, and those which have come into use in one country are often despised in another. We ourselves consume quantities of *Crustacea*, but would be loth to eat the locusts of the East or the fat butterflies of Australia; while the palm worms of the West Indies, though highly esteemed there, have not yet been introduced at the tables of our epicures.

The Indians of the Amazon are less fastidious in their tastes, for while turtles, alligators, lizards, snakes and frogs are all common articles of food, some species of insects and other *Annulosa* furnish them with their greatest luxuries. Six different orders—*Hymenoptera*, *Neuroptera*, *Homoptera*, *Coleoptera*, *Aptera* and

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Annelida—each supply one species to add to the varieties of the Indian's bill of fare.

The first is a great-headed red ant, the *Œcodoma cephalotes* of Latreille. This insect inhabits the whole Amazon district, and, I believe, a great part of Brazil and Guiana, and is one of the most destructive of the whole family. It frequents sandy districts and places where "red earth" is found, but is absent from the "black earth" or the rich alluvial soil of the Amazon. It forms its nests in the woods and in gardens, turning up the soil in such large heaps as to make one doubt whether so small an insect could have been the workman. I have seen elevations of this kind twenty feet square and a yard high, containing many tons of earth. These hillocks are riddled with holes in every direction, and into them the ants may be seen dragging little circular pieces of leaf, which they cut off from particular trees which they prefer; orange trees and leguminous shrubs suffer most from their ravages, and these they will sometimes entirely strip of their leaves in a night or two. Young plants too of every kind suffer very much, and cannot be grown in many places on account of them. They remain in one locality a long time; for on my observing to a gentleman at a cattle estate near Pará how remarkably the track of these ants was worn down across a pathway and through grass, he informed me that he had observed them marching along that very track for fifteen or twenty years. The insects which do this are of course the neuters, which have tremendous jaws. They often swarm in houses at night, crawling over the supper table and carrying away fragments of bread and farina; and should any cloth or handkerchief be left on the ground, especially with anything eatable in it, it will be found in the morning cut in semicircular holes in every direction as neatly as if done with scissors. It is the female of this destructive creature that furnishes the Indian with a luxurious repast. At a certain season the insects come out of their holes in such numbers, that they are caught by basketsfull. When this takes place in the neighbourhood of an Indian village all is stir and excitement; the young men, women and children go out to catch *saübas* with baskets and calabashes, which they soon fill; for though the female ants have wings, they are very sluggish and seldom or never fly. The part eaten is the abdomen, which is very rich and fatty from the mass of undeveloped eggs. They are eaten alive; the insect being held by the head as we hold a strawberry by its stalk, and the abdomen being bitten off, the body, wings and legs are thrown down on the floor, where they continue to crawl along apparently unaware of the loss of their

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posterior extremities. They are kept in calabashes or bottle-shaped baskets, the mouths of which are stopped up with a few leaves, and it is rather a singular sight to see for the first time an Indian taking his breakfast in the *saüba* season. He opens the basket, and as the great-winged ants crawl slowly out, he picks them up carefully and transfers them with alternate handfulls of farina to his mouth. When great quantities are caught, they are slightly roasted or smoked, with a little salt sprinkled among them, and are then generally much liked by Europeans.

The next insect in the list is the *Termes flavicolle*, Perty; a large white ant common in the Upper Amazon. It inhabits holes in the earth about the roots of rotten trees, and is much sought after for food by the great ant-eater, *Myrmecophaga jubata*, as well as by the Indians. In this case it is not the winged female that is eaten, but the great-headed, hard-biting worker, and it is by means of his jaws that the creature is entrapped. An Indian boy going after "*cupim*" takes with him a calabash or a bottle-basket, and searches about for a nest. He then scrapes away some of the earth, and taking a long piece of grass inserts it as far as it will go, and on withdrawing it finds a row of ten or a dozen *Termes* holding tightly on to it; and he repeats this operation till he fills his basket. These insects are also eaten alive or roasted; but in this case it is not the abdomen but the enormous head and thorax which is devoured, as those parts contain a considerable mass of muscular matter. These insects have generally a bitter taste and are not much esteemed, except by the Indians themselves.

The edible Homopterous insect is the *Umbonia spinosa*, which swarms at certain seasons on the Inga trees, which are universally planted by the Indians near their cottages for the sake of the fruit, which is much esteemed by them. The insects fall upon the ground in great numbers, and the sharp spine on their thorax renders walking barefoot very disagreeable. This spine seems to render them very ill adapted for food, but when they first appear the whole body is soft and flaccid, and they are then collected and roasted in a flat earthen pan. They are not, however, so much esteemed as the other insects I have mentioned.

The next edible insect I shall allude to is the larva of a beetle, but of what species or genus I am unable to say, though it is probably a *Calandra*, as it is found in the stem of a palm tree. It is much swollen, and attenuated at each end; and is a rich fatty mass, which is eaten slightly roasted or fried. It is not by any

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means so common in the Amazon as the other edible insects; and in fact, I never saw it eaten, or ate it myself but once. It is called "*muxeiwa*" by the Indians.

The Apterous insect which is eaten by the South American Indians, more I presume as a delicacy than as an article of food, is a species of *Pediculus* which inhabits the heads of that variety of mankind, and is probably a distinct species from that of our own country. The method of capturing and devouring this insect is exactly the same as that which every one has seen adopted by the monkeys at the gardens of the Zoological Society. A couple of Indian belles will often devote a spare half-hour to entomological researches in each others' glossy tresses, every capture being immediately transferred with much gusto to the mouth of the operator.

The remaining annulose animal I have to mention is a singular species of earth worm. It has the body flat beneath, and the rings very hispid. It inhabits the gapó, or flooded lands, in the dry season; and, when the waters rise, it ascends the trees and takes refuge in the hollow leaves of the *Tillandsias*, where it accumulates in great numbers; and it is a singular sight to see an Indian fisherman climb up a tree and return with plenty of worms for bait. In every house these *Tillandsias* may be seen hanging, the leaves carefully tied together at the top to keep the worms from escaping should they get too warm or dry. When more are obtained than are wanted for bait they are boiled with fish; and, though they look very disgusting and are intensely bitter, they are a favourite food with most Indians.

I am not aware of any other insects being used for food by the Indians of that part of South America which I visited, and trust that this short notice of them may call attention to the subject in other parts of the world.

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XXVII. *Descriptions of some New Species of Butterflies from South America.* By W. C. Hewitson, Esq.

[Read January 2, 1854.]

Genus Erycina.

Erycina Saundersii. (Plate XXII. fig. 1.)

Upper Side blue-black, both wings crossed by a nearly continuous band of bright silvery blue intersected by black nervures; commencing at the middle of the costal margin of the anterior wing, it crosses to the anal angle, and is continued parallel to and at a short distance from the outer margin of the posterior wing; anterior wing with a line of scarlet across the end of the cell; posterior wing with a round spot of the same colour on the middle of the abdominal fold.

Under Side as above, except that the scarlet line is absent; that the band across the anterior wing is wider and more brilliant; that there are three spots between it and the base, and a line on the costal margin of the same brilliant blue, and that the costal margin of the posterior wing is broadly of the same blue.

Exp. $2\frac{1}{10}$ inches.

Hab. New Granada.

In the Collections of the Entomological Society and W. C. Hewitson.

This species—a beautiful addition to his favourite genus—is named after a brother Entomologist.

Genus Acræa.

Acræa Amida. (Plate XXII. fig. 2.)

Upper Side black, anterior wing with a large spot at the base, and a transverse band beyond the middle from the costal margin to near the anal angle brilliant scarlet, intersected by black nervures; posterior wing from the base to beyond the middle of a glossy metallic blue.

Under Side. Anterior wing as above, except that the transverse band is yellow; posterior wing light brown, the nervures and lines between each black, the outer margin dark brown.

Exp. $2\frac{2}{10}$ inches.

Hab. New Granada.

In the Collection of the Entomological Society.

This and the preceding species were presented to the Society by Senor T. J. Stevens.

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Genus Papilio.

Papilio Conon. (Plate XXII. fig. 3.)

Upper Side white, transparent towards the apex of the anterior wing. Anterior wing crossed from the costal margin by five short transverse bands of black. The first near the base crosses the median nervure, but *is not continued*, as in *Agesilaus*, on the posterior wing; the second, which is the longest, also crosses the median nervure, the others are shorter; the outer margin and a line which runs nearly parallel to it, and joins it at the anal angle, black and *narrow;* posterior wing tailed, the tail and outer margin black, enclosing six lunular white spots, the base and inner side of the tail white, a lunular black spot at the anal angle, surmounted by one of scarlet.

Under Side. Anterior wing as above, posterior wing crossed near the inner margin by two transverse bands of black. The inner band is straight and passes from the costal margin (where it is marked by a spot of scarlet) to near the anal angle. The outer band is curved, has its inner margin, as in *P. Agesilaus*, bordered with scarlet, and joins the inner band *at a distance from the anal angle.*

Exp. $3\frac{8}{10}$ inches.

Hab. New Granada.

In the Collections of the Entomological Society and W. C. Hewitson.

This species does not differ on the upper side from *P. Protesilaus;* on the under side it does not differ from *P. Agesilaus*, except in the position of the transverse bands on the posterior wing. If not sufficiently marked to form a distinct species, it is at least a curious variety, having the characters of two species, and possessing peculiarities of its own besides.

Mr. G. R. Gray was so kind as to include this species at my request in his British Museum Catalogue. I am answerable for the error in the date there given, having intended to figure it last year.

Genus Hætera.

Hætera Hortona. Plate XXIII. fig. 1.

Upper Side opaque purple-brown, lightest near the outer margins, each wing with a large spot of light blue, forming an oblique band across the anterior wing beyond the middle, and a large round spot from beyond the middle of the costal margin to the centre of the posterior wing; abdominal fold with an orange spot at the anal angle.

Under Side light rufous brown; anterior wing with one minute

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spot at the base and three spots in a line across the cell near the base, black; a rufous line across the middle of the cell; a triangular space at the end of the cell, and a second larger triangular space reaching from it to the inner margin, but at an obtuse angle with it, both with a rufous border; posterior wing with three minute black spots in the shape of a triangle near the base, crossed transversely by three rufous lines, the second and third united at both ends and forming a continuous band with the triangle of the anterior wing.

Exp. $2\frac{6}{10}$ inches.

Hab. River Amazon.

In my own Collection.

Hætera Hypæsia. (Plate XXIII. fig. 2.)

Upper Side transparent, the margins, except the inner margin of the anterior wing, brown, the nervures black; anterior wing crossed obliquely from the lower disco-cellular nervule to the anal angle by a narrow band of brown; posterior wing with the outer margin broadly bordered with purple-brown, enclosing five irregular transparent spots, that near the apex larger than the rest, and intersected by a nervure; two black eyes upon the margin, with iris rufous and pupil white.

Under Side as above, with a light rufous band transversely through the brown border of the posterior wing above the white spots.

Exp. $4\frac{2}{10}$ inches.

Hab. New Granada.

In the Collection of the Entomological Society.

Genus Dircenna, *Doubleday.*

Dircenna Duillia. (Plate XXIII. fig. 3.).

Upper Side transparent, tinted with purple and yellow, slightly clouded beyond the middle; the nervures black and distinct, their termination on the outer margins marked by triangular spots of brown, with between each, also on the margin, an indistinct round spot of lighter colour than the rest of the wing; anterior wing with the costal margin from the base to the end of the cell dark brown, followed by an oval spot of light yellow, after which it is rufous to the apex, which is brown; the inner margin brown; posterior wing with the costal margin brown, the inner margin broadly rufous and opaque.

Exp. $3\frac{4}{10}$ inches.

Hab. New Granada.

In the Collection of the Entomological Society.

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It is with some hesitation that I have added this singular species to Doubleday's genus *Dircenna*. It differs from the other species widely in the neuration of the posterior wing, but not more so than many species of *Ithomia* do from each other.

This and the preceding species, both quite new, form part of a valuable collection of insects presented to the Entomological Society by Senor T. J. Stevens, of Bogota.

XXVIII. *Notes on the Habits of a Bee-parasite*, Melittobia Acasta.* *By* Frederick Smith, Esq.

[Read Nov. 7th, 1853.]

I have much pleasure in laying before the Society the results of some observations on a bee-parasite which infests the nests of *Anthophora retusa*. This insect has formed the subject of several most interesting papers by Mr. George Newport which have appeared in the Transactions of the Linnæan Society.

Mr. Francis Walker first described the female of this remarkable species, and included it in the genus *Cirrospilus*, by mistake supposing it to be a male; but on my presenting him with examples of the sexes of *Melittobia*, he instantly recognized his species *C. Acasta* in the female.

The first notice of the male is to be met with in Mr. Westwood's Introduction to the Modern Classification of Insects, vol. 2, p. 160; and in the Proceedings of the Entomological Society for 1848 he pointed out the prominent generic characteristics, proposing the name *Melittobia* for the genus; and in 1849 Mr. Newport's first paper on the same insect was read before the Linnæan Society; the above data will therefore show the necessity for adopting Mr. Westwood's name *Melittobia* for the genus, and Mr. Walker's name *Acasta* for the species.

Mr. Newport's first paper on this insect was read to the above Society in the year 1849, since which time I have been exceedingly anxious to obtain a knowledge of the parasite through personal

* Since the reading of this paper, in which the insect was mentioned by Mr. Newport's name *Anthophorabia retusa*, (see Proc. p. 135,) Mr. Walker has informed me that he had described the bee-parasite in 1839. The synonomy will therefore stand as follows:—

Cirrospilus Acasta, Walk. Mon. Chalc. Add. p. 328, ♀ (1839).

Melittobia Audouinii, West. Proc. Entom. Soc. Lond. p. xviii. ♂ (1847).

Anthophorabia retusa, Newp. Trans. Linn. Soc. xxi. p. 63, ♂ ♀ (1852).

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observation, and have diligently searched for them each succeeding spring and autumn, but it was not until the present season that my search proved successful.

On the 10th of September last I discovered two cells of *Anthophora* containing abundance of the larvæ of the parasite *Melittobia*; and three others, containing larvæ of *Monodontomerus*; also a Chalcididous parasite on *Anthophora*; these and an abundance both of the larvæ and pupæ of the bee I carried home, and on the following day was occupied in arranging my acquisitions. In one of the cells containing larvæ of *Monodontomerus* I observed five or six females of *Melittobia*, and on placing the cell under a microscope I distinctly observed a female in the act of depositing. The eggs are surprisingly large as compared with the diminutive parasite; they are, when first deposited, nearly globular, but soon change to an elongated oval. I am inclined to consider them ovoviviparous, having failed in observing any extrusion from the egg, after most careful and repeated endeavours to do so.

On further examination I found many of the larvæ of *Monodontomerus* were either infested with eggs or larvæ of *Melittobia*. As well as I could decide, it appeared, that in no case were more than three eggs, or larvæ, to be found on a single specimen. The parasites have since the 22nd of September successively left their victims, and lie inactive at the bottom of the glass tubes or cells. Twelve or fourteen days appear probably the time usually occupied in feeding, when unarrested by change of temperature; many still remain attached to their victims, being in different stages of growth.

On a careful examination of both the cells containing the larvæ of *Melittobia*, two days after obtaining them, I observed the occupants of one cell, in some instances, changing to the nymph or pupa state; after which, day by day, they progressed rapidly towards their perfect condition; and on the morning of the 21st of the month I found eight females arrived at maturity. On the following day, a single male was developed; on first detecting it, it was in coition with a female. The males are exceedingly salacious, and may frequently be observed in coitu. On the 23rd another male appeared, and I determined to remove it into a separate tube, containing a larvæ of the bee, in company with five females, in order to ascertain its duration of life. Day after day it remained healthy and active, and I exhibit the same insect this evening, it being now six weeks and four days old.* I therefore conclude Mr. New-

* I have, since this paper was read, ascertained that the males usually live about seven weeks; of three males this was their duration of life, there not being more than a day's difference between them.

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port's insects must have been placed in some condition detrimental to their existence, as he found all the males which came forth in the afternoon of one day dead on the following morning; which led him to conclude that they are very short-lived insects, but direct observation proves such a conclusion to be erroneous; and the very fact of the paucity of males as compared to females, sufficiently appears to indicate a different economy. The bee's cell contained about seventy larvæ, only four of which became males, and by these the whole brood has been fecundated.

The most remarkable circumstance connected with the attacks of these parasites, is the preference which they have shown in attacking the larvæ of *Monodontomerus*. Although I placed larvæ of these, and also of the bee, in the same boxes, I invariably found that they first attached themselves to the cells containing the parasitic larvæ; never, as far as I have observed, depositing more than three eggs on one victim; and I have now in my possession three broods of *Melittobia* nurtured by *Monodontomerus*, and six which have fed or are still feeding on the larvæ of the bee.*

These circumstances taken into consideration, a question naturally arises, is *Melittobia* the true parasite of the bee, or is it the parasite of *the parasite* of *Anthophora? Monodontomerus* being *truly the bee-parasite!* my observations would induce me to believe the latter. We must, however, bear in mind, that the results I am communicating are upon insects placed in an artificial position, and it still requires more direct observation of them in their natural situations, before we can decide the question. It does not appear that Mr. Newport ever found them feeding upon the bee-larvæ; and, as I have shown above, I detected them in the cell of *Monodontomerus* in their natural position. On a future occasion I hope to have the pleasure of laying before the Society the results of the various operations now in progress; and as I may confidently expect to obtain a large number of parasites, I shall not fail to avail myself of the opportunity for further observations.

In the paper alluded to two species of *Melittobia* are described, but in all probability these really constitute but one; the characters of the first, "*retusa*," both generic and specific, having been laid down from drawings and other memoranda, made at a time when, to use Mr. Newport's own words, he "took little heed of them;"

* The process of depositing is the work of some weeks. The cell now exhibited to the Society contains six females and one male; they have now continued during forty-two days their deposit of eggs; many of the larvæ are full fed, but others are so minute as to render it difficult to decide whether they are in the egg or larva state.

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this was in 1831: in 1851 the parasites were rediscovered, and accurate characters were then given; with the latter my own insects agree.

A question of much interest has arisen from the fact of Mr. Westwood having in his "Introduction," vol. ii. p. 160, described an insect communicated to him by M. Audouin, which was found in the nests of *Anthophora*, *Osmia* and *Odynerus*. Mr. Westwood describes the male as having "most singular antennæ and minute rudiments of wings, so that it does not quit the cell;" from these characters, all possessed by the *Anthophorabia* of Mr. Newport, it has appeared highly probable that the latter insect might be identical with *Anthophorabia*, and it is to be regretted that a question so easy of solution has not long since been decided. It has fallen to my lot to have the first opportunity of comparing the two insects.* In consequence of apparent discrepancies their identity has been deemed impossible; but when I point out the way in which these are to be accounted for, the objections will at once disappear. It must be borne in mind that Mr. Newport's descriptions are from either living or very fresh specimens, and that many of the characteristics of such individuals are not to be observed in a dried specimen; the insects are of so delicate a texture, so semitransparent, and exhibit colours which soon after death entirely disappear; thus, the convex face of the insect sometimes falls in, the thorax becomes more or less distorted, the abdomen no longer shows the transverse fasciæ or retains its original form; the dark stains on the sides of the head, which mark the usual situation of the compound eyes in insects, in most cases entirely disappear to the naked eye; and it was under all these disadvantages that the short and merely general description was made, so that we need not be at all surprised at finding it stated that the eyes and stemmata are wanting. I have most carefully compared the insects, aided by a powerful microscope. I have been solely prompted by a desire of arriving at the truth; and although the stains on the sides of the head in Mr. Westwood's insect are no longer visible, still I have detected the simple ocellus which exists in *Anthophorabia* in the situation of the usual compound eye; the ocelli are also present, and the antennæ are identical in form, each joint in fact the counterpart of that of *Anthophorabia*. These circumstances, combined with those stated above, convince me that the insects are mutually identical; such is my opinion of them specifically, and of their belonging to the

* Mr. Westwood having presented specimens of *Melittobia* to the British Museum some time ago.

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same genus I think there cannot exist even the shadow of a doubt.

I have for some years very closely investigated the economy of our indigenous aculeate *Hymenoptera*, and I am fully sensible of the fact, that the same species exhibits under different influences and circumstances considerable variety in the various phases of its development; and, as an illustration of this, I will quote two passages from Mr. Newport's papers. In one read on the 20th of March, 1849, which details the economy of *Monodontomerus*, the following occurs: "Shortly before they were ready to enter the nymph state the alimentary organs became perforated, and fæces were passed for the first time during the whole period of the insects' previous existence. The fæces passed were little *solid brown masses* that closely resemble the fæcal masses passed by the pollinivorous larva of *Anthophora*." In another paper read on the 5th of March, 1850, the following occurs—in speaking of the contents of a cell of *Anthophora*, in which the insect had changed to the nymph state, and had been subsequently attacked by parasitic larvæ: "All which this cell contained were the parasites and the remains of the nymph, together with the larva skin it had thrown off on assuming this condition, while the larger end of the cell was coated with a perfectly *smooth layer* of ejecta; a coating which, as I formerly stated, it always gains after the larva has ceased to feed and before it changes to a nymph:" so that in the latter instance there were no solid masses such as are *usually* passed by *Anthophora*. I am therefore greatly surprised to find exceptions taken to statements of my own communicated to the Linnæan Society. I remarked that in a cell containing a number of the larvæ of *Monodontomerus*, that besides these all that remained after they had consumed the nymph was a portion "of yellow dust or small granules;" other words for "little brown masses," which were observed by Mr. Newport in the first instance quoted. The facts recorded should have induced the author to pause before he came to the conclusion that my statement originated in oversight or mistake.

I would, before I conclude, call attention to a remarkable circumstance connected with the parasite *Melittobia*. The whole and sole purpose of their existence appears to be to keep in check the numbers of other insects; and we may reasonably conclude on the part of the male sex, without ever emerging into the light of day, and on the part of both sexes when arrived at their perfect condition, without during several weeks requiring any kind of nourishment; two of my broods are in glass tubes, without, as far

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as I have ascertained, consuming any nourishment, incessantly occupied in following out the purposes assigned to them: and what have they subsisted upon? Unless the perfect insects, as well as the larvæ, derive nourishment from the fluids of the bee-larva, it would appear that they really require none; and that during the whole period of their existence, without food, in the dark cells of the bee, they unceasingly pursue their attacks upon their victims; and, as will in all probability be discovered, being themselves kept in check by other parasites equally fatal to them.

XXIX. *On the Habits of the Butterflies of the Amazon Valley.* *By* Alfred R. Wallace, Esq.

[Read 7th November and 5th December, 1853.]

As the portion of South America, watered by the river Amazon, has recently contributed so many new and beautiful species of butterflies to our Cabinets, it is thought that a few remarks on the habits of such of them as fell under the writer's notice during a residence of four years in the country may not be unacceptable to the Entomological Society.

It may be as well, by way of preface, to give some brief account of the district in question.

South America, as a whole, may be looked upon as consisting of three elevated regions, connected by intervening low lands and valleys. Along the west side of it stretches out from one extremity to the other the mighty Andes, though not the loftiest, yet undoubtedly the most extensive unbroken mountain range on the earth. Various spurs and branches are attached to this chain, but they never extend far across the continent in an eastern direction. Towards the Atlantic rise the mountains and table lands of Brazil and Guiana, two large isolated masses, everywhere separated by a wide interval from each other and from the Andes. In the space between these the Amazon rolls its mighty flood through a vast alluvial valley, which is everywhere clothed with dense forests of lofty timber trees. The whole of this valley lies in the very centre of the tropics, and enjoys a climate in which a high and uniform temperature is combined with a superabundance of moisture.

These seem to be the conditions most favourable to the development and increase of Lepidopterous insects, and we accordingly

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find the valley of the Amazon to be more productive of the diurnal species than perhaps any other part of the world. Where else in a single locality can 600 species of butterflies be obtained? and this can be done within a walk of the city of Pará.

We may divide the country into four sorts of hunting grounds, each of which possesses its peculiar species rarely found in the others. 1st. The open grounds, or "campos," natural or artificial, and dry and barren places. Here we find scarcely any peculiar Amazonian species, and generally only a few of the commonest South American insects, such as *Papilio Polydamas*, *Danais Archippus*, and several common *Callidryas*. 2nd. The margins of the rivers, particularly during the season when the waters are falling. Here are found numerous beautiful and rare *Papilios* and species of *Timetes*, *Cybdelis*, *Callianira* and *Megistanis*, with occasionally *Aganisthos*, *Marpesia* and *Victorina*. 3rd. The second growth woods, plantations, and shady roads and paths. In such places the *Heliconidæ* abound, and that beautiful group of American *Papilios* with red spotted lower wings. Here are hundreds of *Erycinidæ* and gorgeous *Theclas*; and here the *Epicalias* and *Callitheas* are to be met with, while numbers of *Morphos* flap lazily along, and *Hesperidæ*, sometimes as large as *Sphinxes*, dart by with the velocity and sound of humming birds. And, 4th, is the gloomy virgin forest, in whose damp recesses are found numbers of beautiful *Satyridæ*, many delicate *Ithomias*, and some of the most beautiful *Eurygonas*, *Mesosemias* and *Theclas*. The individuals are however never so abundant as in more open places, and much perseverance is required in the collector, which, however, seldom fails at length to be rewarded by some rare and exquisitely beautiful insect.

I shall now notice in succession the most important genera and species, with such observations on their habits as I am enabled to offer.

Beginning with the true *Papilios*, the first that presents itself is the well-known American swallow-tail *P. Protesilaus*. This is abundant in all parts of the Amazon district, but is always seen on the water's edge, where it assembles by scores and even hundreds in dense masses, preferring places where some decaying animal matter or excrement has laid,—the juices from which it sucks up with great avidity. When thus occupied I have often sat down within a few feet of them, and have caught with my fingers a single specimen of the rare *P. Agesilaus* from among a hundred of the commoner species. At such times I have noticed them ejecting from the anus a watery liquid in successive jets,

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which they will continue to do for a very long time. I have dissected dozens of these insects in the hope of finding a female, which I never succeeded in doing, every specimen of *Papilio Protesilaus* which I have seen being a male.

In the same places, and often mixed with the last, are found *P. Dolicaon* and the more beautiful *P. Columbus*, the latter being the more abundant of the two. In similar situations we have *Polycaon*, *Lycidas*, *Belus* and *Pausanias*, of all of which the males only are found on the river's edge, the female of *Polycaon* (the only one yet determined) frequenting the skirts of the forest, and flying about orange trees.

Thoas, *Polydamas* and *Torquatus* are found in open grounds and about houses, localities frequented by many common South American species, which have an extensive range, and do not seem to be truly indigenous to the Amazon valley.

It is in the shady groves and in the depths of the virgin forest that the great mass of the species of *Papilio* are found. These all belong to the group which have white or bluish spots on the upper wings and red on the under. They fly weaker than the other species, and seldom appear in full sunshine. *Sesostris*, *Hierocles* and *Cutora* are among the most beautiful of these; *Echelus*, *Gargasus*, *Aglaope*, *Marcius* and *Parsodes* are abundant, and very characteristic of the Amazon district. In several of these there are remarkable differences in the colours of the sexes, which do not exist in others; while of a great proportion we are still ignorant of one or the other sex. This is partly owing to the males and females seldom frequenting the same situations; thus, while *Vertumnus* and *Sesostris* (males) are found only in the damp and shady forest, their females frequent gardens, and appear to deposit their eggs upon orange trees, round which I have taken them hovering. The larvæ of butterflies, as with us, are remarkably scarce, which is the more to be wondered at, as the perfect insects are in such profusion; and thus the most satisfactory means of ascertaining the sexes of these insects can be pursued with but little success. The only *Papilios* I was enabled to breed were *Polydamas* and *Anchisiades*, species which exhibit no marked difference between the sexes. *Triopas*, which belongs to the same group, though the red and white spots are both replaced by yellow, is the smallest and most delicate of the true *Papilios;* and its habits agree with its appearance, for it frequents the shadiest part of the forest, and flies weakly and always near the ground. It is found at Pará, and all over the Amazon district; but the closely allied *Chabrias* is a native of the interior only, both on the

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Upper Amazon and near the tributaries of the Orinoco. In ascending the Amazon several of these interesting modifications of form occur. The *Vertumnus* of Pará is replaced at Santarem, only 500 miles up the river, by the closely allied *Cutora* of G. R. Gray, &c. On the Upper Amazon we have *Ergeteles* instead of the *Parsodes* of Pará. The following list shows thirty-eight species of *Papilio* in the small portion of the district yet examined. I have arranged them according to the stations they frequent, and have distinguished those which occur only in the interior.

Species of *Papilio* inhabiting the Amazon valley:—

a. Species habitually frequenting the banks of the rivers at the water's edge:—

Protesilaus ♂ ..Very abundant.
Agesilaus ♂....Rare, with the last.
Polycaon ♂ ....The ♀ never accompanies it in this situation.
Dolicaon ♂ ....Generally distributed.
Columbus ♂ ....Upper Amazon, abundant.
Pausanias .....Upper Amazon, scarce.
Lycidas .....Upper Amazon, abundant.
Belus ..... Upper Amazon, abundant.

b. Species frequenting gardens and open grounds:—

Thoas .....Abundant.
Torquatus .....Abundant.
Polydamas ....Common everywhere.
Caudius .....Scarce.

c. Species which rarely leave the forest:—

Species peculiar to the Upper Amazon.

Patros.	*Ergeteles.*	*Cyamon.*
Cixius.	*Brissonius.*	*Evagoras.*
Orellana.	*Bolivar.*	*Chabrias.*

Species occurring at Pará.

Diceros.	*Hierocles.*	*Sesostris.*
Æneides.	*Marcius.*	*Hippason.*
Æneas.	*Aglaope.*	*Ariarathes.*
Thelios.	*Sonoria.*	*Anchisiades.*
Parsodes.	*Vertumnus.*	*Triopas.*
Echelus.	*Cutora.*	

The *Pieridæ* generally are open-ground butterflies, two genera only, *Leptalis* and *Terias*, being true denizens of the forest. Of the former but one species, the *L. Eumelia*, is at all common. It,

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however, may be found almost everywhere, hovering slowly along in shady woods and plantations, and offering an easy prey to the Entomologist, as well as to the more merciless insect-eating birds. The species of *Terias* prefer rather the dry and more open parts of the forest country, and often even come out into the full sunshine. Several species of *Pieris* accompany them; but they cannot vie in strength and rapidity of flight with the species of *Callidryas*, which rejoice in the hottest sunshine, and crowd in dense masses of several yards in extent around puddles and on sandy beaches, rising in clouds of yellow and orange on being disturbed.

The *Rhodoceras* again are of a sylvan taste, the handsome *R. Leachiana* being found only in open paths through the forest.

We now come to a group of insects peculiar to America, the *Ageronidæ*, and in them we first see a deviation from the normal manner of carrying the wings in repose; the species of this family invariably resting with the wings expanded. Five species are found about Pará, and they all frequent dry situations, and always settle on trunks of trees, with the head downwards. The singular noise produced by these insects has been noticed by Lacordaire and Mr. Darwin. The common species, *A. Feronia*, produces it remarkably loud, when two insects are chasing each other and constantly striking together. One alone does not produce the sound in flying; and I have never heard it made by the small species, *A. Chloe*, which is equally common with the other. I am inclined, therefore, to believe that it is produced in some way by the contact of two insects, and that only the larger and stronger winged species can produce it.

Like M. Lacordaire, I have found the pupa of a species of this family, but never the larva. It agreed exactly with his description, and was attached to a post, and braced like that of a *Papilio*.

Of the *Danaidæ* two species only are found on the Amazon. They frequent the most open situations, fly low, and constantly settle on herbaceous plants. In the beautiful family of *Heliconidæ*, the glory of South American Entomology, the Amazon valley is particularly rich, at least sixty or seventy species being found there, of which a considerable number seem peculiar. And here the same thing takes place which we observed with regard to the *Papilios*,—that the more rare and restricted species are those which inhabit the forest, while the species found in the open grounds are generally widely distributed, and often seem mere stragglers from other parts of the continent. Among these latter are *Lycorea Halia*, *Tithorea Megara*, and *Mechanitis Lysidice*, while most of the

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species of *Heliconia*, *Thyridia* and *Ithomia*, which prefer the forest shades, are confined to a comparatively limited district. The most characteristic of the Amazon valley are those species of *Heliconia* with white or yellow spots on a shining blue or black ground, such as the *Antiocha*, *Thamar*, and several others; those with radiating red lines on the lower wings, such as *Erythræa*, *Egeria*, *Doris*, and several undescribed species; and, lastly, the delicate little clear wings of the genera *Thyridia*, *Ithomia* and *Sais*. All these groups are exceedingly productive in closely allied species and varieties of the most interesting description, and often having a very limited range; and as there is every reason to believe that the banks of the lower Amazon are among the most recently formed parts of South America, we may fairly regard those insects, which are peculiar to that district, as among the youngest of species, the latest in the long series of modifications which the forms of animal life have undergone.

The *Heliconidæ* are the most elegant of butterflies, whether upon the wing or in a state of repose. Their bodies, their wings and their antennæ are all long, slender and well formed, and they are universally adorned with the most brilliant and harmonious colours. They fly rather slowly, and the little *Ithomiæ* hover almost invisible among the dark foliage. They all rest with their wings erect, upon leaves and flowers, and at night I have observed them asleep, hanging at the extreme end of a slender twig, which bends with their weight and swings gently with the evening breeze.

At the extremity of the abdomen these insects possess a peculiar gland or appendage, concealed between the valves of the anus, but capable of being protruded. It is most developed in *Lycorea halia*, where it takes the form of a radiate tuft of hairs, forming, when exserted, two feathery globes at the extremity of the abdomen. In an undescribed species allied to *Heliconia Erythræa* it is also much developed, in the shape of small fleshy balls of an orange colour, which are always exserted when the insect is captured, and give out a penetrating aromatic odour something resembling chamomile.

As a whole, the *Heliconidæ* are the most abundant butterflies of the Amazon, and form by far the most striking feature in the Entomology of the country.

The species of *Acræa*, *Eneides* and *Eresia* remarkably resemble *Heliconidæ* in their mode of flight and habits, as well as in their form and markings, and they are almost always found in com-

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pany with the species of that family which frequent open grounds, for none of them are forest insects.

The next genera, *Colœnis*, *Agraulis*, *Melitæa*, *Euptoieta*, *Junonia* and *Anartia*, closely resemble our own *Nymphalidæ*. They frequent open grounds, delight in hot sunshine, and the Amazon species are all common and widely distributed. The larva of the *Agraulis Vanilla* feeds on the Passion-flower, as, Mr. Doubleday says, it does in Florida. *Colœnis Dido* is a beautiful object in the sunshine, its wings appearing of a bright transparent green.

The species of *Eubagis* are delicate little butterflies, which frequent flowers and low herbage on the skirts of the forest. *Timetes*, *Marpesia* and *Victorina* are three genera, the species of which are often found in company, on the skirts of woods and at the water's edge, together with the *Callidryas*. *Timetes Chiron* and *Orsilochus* are common at Para, in the more open forest; *Themistocles*, *Chrethon*, *Berania* and *Tutelina*, on the Upper Amazon, generally at the water's edge.

The beautiful genus *Cybdelis* is one almost peculiar to the great valley of the Upper Amazon. Scarcely a species is known from Pará, while nearly a dozen occur in the interior. They all fly with excessive rapidity, and are exceedingly shy; they settle on trunks of trees or on rocks by the water, where several species are only found. They swarm on the granite rocks of the Rio Negro in the heat of the day, where the places they sit upon would be hot enough for culinary operations.

The species of *Epicalia*, ornamented with the richest blue and orange bands upon a velvety black ground, are among the most brilliant of the diurnal *Lepidoptera*, and many of them grace the dense forests of the Amazon. Those beautiful insects, *Epicalia Ancea*, *E. Acontius* and *E. Numilius*, are found at Pará, while in the interior several others occur. They much resemble each other in their habits; they fly strongly, but with an even sailing motion, frequently moving in a circle, and returning repeatedly to the same leaf. They frequent shady glades in the damp parts of the forest, and usually sit with the wings erect, but will occasionally select a spot where a gleam of sunshine enters, and there expand their wings to enjoy its warmth. Many of these insects have been ascertained to be the males of species of the genus *Myscelia*, which differ remarkably from them in colour. Others, however, like *E. Ancea*, have females more nearly resembling themselves. The two groups should be kept separate.

The *Callitheas* are another genus of butterflies unsurpassed for exquisite beauty. The *C. Sapphira* inhabits the south bank of the

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Lower Amazon, while immediately opposite to it is found an allied species, the *C. Leprieurii*. A third species has been discovered by Mr. Bates, on the south side of the Upper Amazon, and has been named after him; while a fourth, equally beautiful, which I found near the sources of the Rio Negro, was lost with the rest of my collections on my return voyage, and so remains to be rediscovered. They all frequent dry, open woods. The females often fly low, but the males settle on the leaves of lofty trees, and are very difficult to capture. The *C. Leprieurii* was found plentifully on the trunks of trees, where a black sap was exuding. In their flight they much resemble the *Epicalias*.

The next group of insects I shall mention are but poorly represented in the Amazon valley. The *Catagrammas* seem to abound most in the mountains, and not more than three species occur in the district under consideration. As might be expected, therefore, they prefer dry situations, and are very active in their movements; they often settle on the ground and on trunks of trees, and after rain come to the open places about houses. The *Heterochroas*, the representatives of the *Limenitis* of the old world, resemble them in their steady sailing flight. They are found in the open glades and on the skirts of the forest.

Callizona Acesta and *Gynecia Dirce* are two singular butterflies, resembling one another in their markings and in their habits. They settle upon trunks of trees as invariably as the *Ageronias*, but always carry their wings in an erect position. The two are often seen together, and are both equally common. They frequent trees from which sap is exuding, and never by any chance rest upon a leaf or flower.

Prepona Demophron and *Hypna Clytemnestra* have very similar habits to the last, but are not so exclusively attached to a particular station; sitting upon a stick or leaf when it appears most convenient. They fly very strongly and delight in dry sunny places. The genera *Paphia* and *Siderone* have very similar habits, and frequent the same situations.

Aganisthos Orion, Megistanis Cadmus and *M. Bœotus* are very strong-winged insects, and are generally found near the rivers, preferring to settle on damp spots on the ground, and often at the water's edge, where in the dry season, on the Upper Amazon and Rio Negro, they are very abundant. The *M. Bœotus* first occurs on the Amazon and Rio Negro, a few hundred miles above their junction, and continues abundant up to the Andes. The blue and the orange varieties are found together, and in almost equal numbers, and there is little doubt are sexes of one species.

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We now come to the giants among butterflies, the *Morphidæ* and *Brassolidæ*. The magnificent *Morphos* are abundant at Pará and in every part of the Amazon valley; but the rare *Hecuba* is found only in the interior. The *Morphos* are forest insects, rarely coming into the open grounds, and often flying for miles along roads and open pathways. Their flight is slow and undulating, but they are very difficult to take on the wing. At Barra, on the Rio Negro, in the month of July, I found *Morpho Hecuba* very abundant. Its habits differed from the other species, as it frequented the open woods and glades in the vicinity of the city, but only for about an hour every morning from 9 to 10 o'clock; at other times not one was to be seen. It flew rather high, and was so very cautious in rising suddenly to escape the net, that, notwithstanding all my endeavours, I succeeded in obtaining very few specimens. These are all diurnal insects, while the genera, *Caligo* or *Pavonia*, *Dynastor*, *Opsiphanes* and *Brassolis* are truly crepuscular, never flying by day except when disturbed, but appearing to be voluntarily active only for about half an hour before sunrise and after sunset. They remain hid during the day in the gloomiest shades of the forest, where I have sometimes encountered them; and even when they come out they take but short flights, frequently settling either on the ground in a pathway, or on a leaf, before resting on which they generally make several trials to find one which will not bend too much with their weight. I have bred *Brassolis Sophoræ* from the larva which feeds on the leaves of the cocoa-nut palm and much disfigures them.

The next family, the *Satyridæ*, agrees with the last as much in habits as in form and marking. The great characteristic of the South American *Satyridæ* is their frequenting the shadiest parts of the forest, and their invariably flying along or very near the ground. So universal is this habit that I do not remember to have ever seen any species rise four feet from the earth, while the greater number of them do not exceed as many inches. They rest also upon the lowest herbage or upon the ground itself. The exquisite clear-winged *Hæteras* all have this habit in perfection. *H. Piera* is common all over the Amazon district. *Esmeralda* is widely distributed, but scarce; and *Andromeda* does not occur at Pará, but is found in company with *Esmeralda* in the interior. *H. Philoctetes* is also widely distributed, but very rare, and I took one specimen of the singular *Caerois Chorinæus* at Santarem, on the south or Brazilian bank of the Amazon, in a dry open forest.

I will here mention the beautiful *Bia Actorion*, which, though

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classed with the *Nymphalidæ*, exactly agrees with this family in its haunts and mode of flight; and as it agrees with them also in many structural points, it may be considered as forming a very satisfactory link connecting the two families.

Didonis Biblis, belonging to the *Eurytelidæ*, is common in many parts of the Amazon. It frequents open and rather sunny places, but flies low and weakly.

A singular butterfly with greatly developed palpi, named *Libythea Cuvieri* in the British Museum Collection, I found abundantly at Santarem flying about marshy meadows in the sunshine.

We now come to the *Erycinidæ*, another extensive family of almost peculiarly American insects, and which exhibit a variety and brilliancy of colouring unsurpassed in the whole order. In these too the Amazon is particularly rich, producing about two hundred species. More than any other butterflies, the *Erycinidæ* are the inhabitants of the virgin forest in whose dark recesses many of the rarer and lovelier species are alone to be found. Some of the larger kinds, such as the genera *Helicopis*, *Erycina* and *Stalachtis* are common in the skirts of the forest, and even come out into the sunshine, where *Eurybia*, *Eurygona* and *Mesosemia* are scarcely ever seen.

The great mass of the species of this family have a very peculiar habit of invariably settling and reposing on the under surface of leaves with the wings expanded, but there are some striking exceptions to this rule. The beautiful golden-spotted *Helicopis cupido* and allied species, though they always settle on the undersides of leaves, yet invariably do so with the wings closed, as in the more typical butterflies. The species of *Charis* and *Themone*, on the other hand, prefer the upper surface of leaves for their station, where they expand their wings; while the true *Erycinas* rest with wings closed upon leaves, like the typical *Papilios*, which by their tailed wings they distantly resemble, though their strong, rapid and jerking flight is like that of the *Hesperias*. These different modes of resting are very peculiar and interesting, because they are so very constant and uniform in the same genus. Is there any anatomical peculiarity which leads *Nymphidium* always to expand its wings in repose and *Helicopis* always to close them? and for what reason should *Charis* always expose itself on the upper surfaces of leaves, while hundreds of its more modest or more timid allies invariably take advantage of the friendly shelter afforded them and rest upon the under side?

There are some other peculiarities in the habits of the different genera worthy of notice. *Eurybia* and *Eunogyra* always keep

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within a few inches of the ground, like the *Satyridæ*, which in their peculiar ocellated markings they both so much resemble; almost leading us to suppose that the colour and marking of an insect affects its habits, or vice versâ. The *Erycinas*, as I have already remarked, fly as strongly and as rapidly as the *Hesperias*. *Emesis* and *Nymphidium* are also rapid flyers, while *Stalachtis*, which approaches *Heliconia* in size and markings, resembles it also in its flight and frequents the same situations. Most of the other genera are weak but rather active flyers, and from their small size and their suddenly disappearing beneath a leaf, are not always easy to capture.

We now come to the *Theclas*, of which about sixty species may be found at Pará, more than half of which are still undescribed. *Endymion*, *Marsyas*, *Etolus* and others, frequent the open grounds in the sunshine, while *Pholeus* and many more are found only in the depths of the forest. All fly very quickly and settle upon leaves and flowers with the wings erect. They have a very peculiar habit of moving the two lower wings over each other in opposite directions, giving an appearance of revolving discs. In the interior the species are not nearly so numerous as at Pará, and this seems to be generally the case in other parts of Brazil, many species being recorded from Pernambuco and Rio as well as from Honduras and Florida, but few from the mountainous districts in the interior of the country. I do not find a single species recorded from Peru or Bolivia or any of the countries west of the Andes.

We have now reached the last family of butterflies, the *Hesperidæ*, which are particularly abundant in South America, and of which about 200 species may be taken at Pará. Like the *Theclas*, they are far less numerous in the interior. Our own little skippers afford but a faint idea of the variety and beauty of the tropical *Hesperidæ*, some of which expand upwards of three inches. Neither do the habits of our species hold good for the whole family, which presents many important characters. There are three distinct modes in which the wings are carried in repose:—1st. They are closed and carried erect as in the typical butterflies; 2nd. The fore wings are elevated while the hind ones expand; and 3rd. The wings are all expanded. The great majority of the South American species belong to the first of these divisions, such as the genera *Pyrrhopyga*, *Ericides*, *Goniurus*, *Goniloba*, and some species of *Pamphila*, as *P. Epictetus*. To the second division, which includes one British species, very few South American *Hesperidæ* belong, principally of the genus *Pamphila*; but the third

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comprehends a very peculiar group of insects, consisting of the genera *Pyrgus*, *Nisoniades* and *Achilodes*. They have the upper wings more or less convex, and never erect them in repose, and they will, I believe, form a very natural subdivision of the family.

The different genera vary much in the situations they frequent. The beautiful *Pyrrhopyga Mænas* and *Ericides Gnetus* were found in open places on sandy beaches, often settling on the ground and seeking out dead fish or decaying animal matter to alight upon. *Goniuris Proteus* prefers open grounds in the hot sunshine, as does *Goniloba Exadeus*, while the greater number of the species with vitreous spots occur in the thick woods and many in the depths of the virgin forest. The smaller species have the characteristic mode of flight which has obtained for them the name of skippers, but some of the larger and strong-bodied kinds are remarkable for the excessive rapidity of their flight, which I believe exceeds that of any other insects. The eye cannot follow them as they dart past; and the air, forcibly divided, gives out a deep sound louder than that produced by the humming-bird itself. If power of wing and rapidity of flight could place them in that rank, they should be considered the most highly organized of butterflies.

Several species of *Castnia* occur on the Amazon, which, though diurnal in their habits and brightly coloured, cannot be classed with the butterflies. They also rest with their wings deflexed, so that the upper only are visible, after the manner of the *Bombycidæ*, and they generally sit upon the end of a stick or twig in the full sunshine.

In conclusion, I venture to hope that if my observations are wanting in detail and in precision as to the exact species to which they apply, it may be imputed, not to want of accuracy on my part, but to the loss of a large portion of my notes and collections during my return voyage to this country. I trust, however, that in the absence of much information on the habits of exotic insects, my remarks, however imperfect, may not be altogether valueless.

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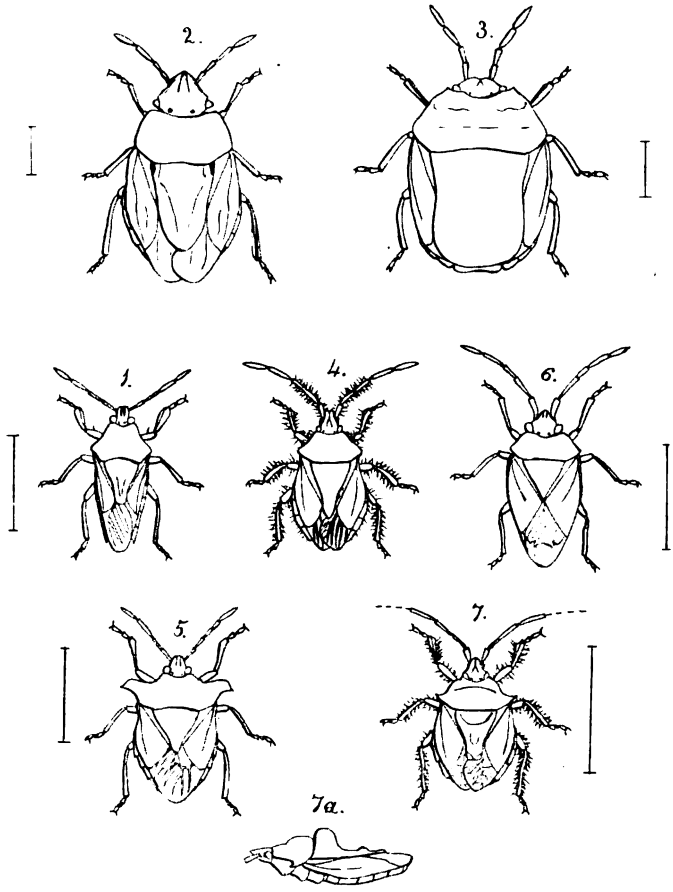

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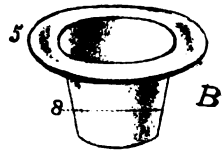

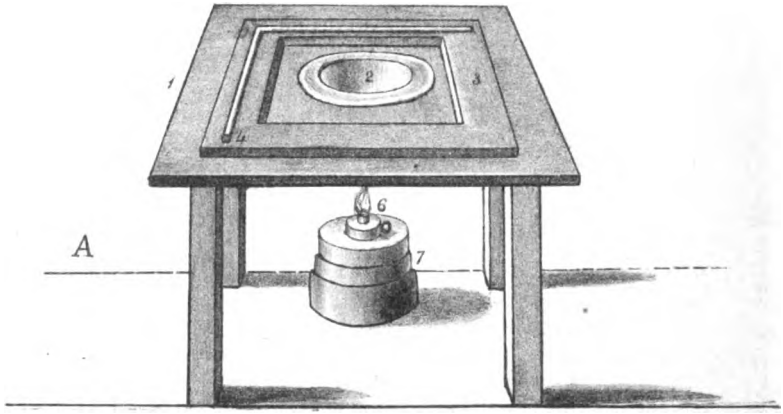

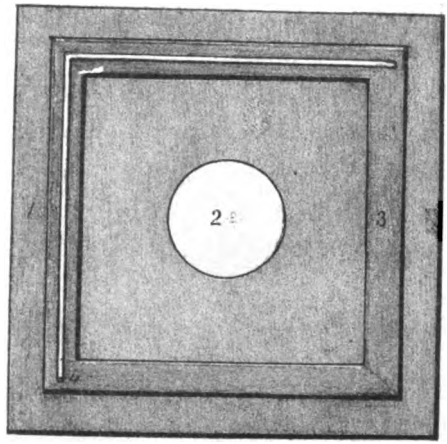

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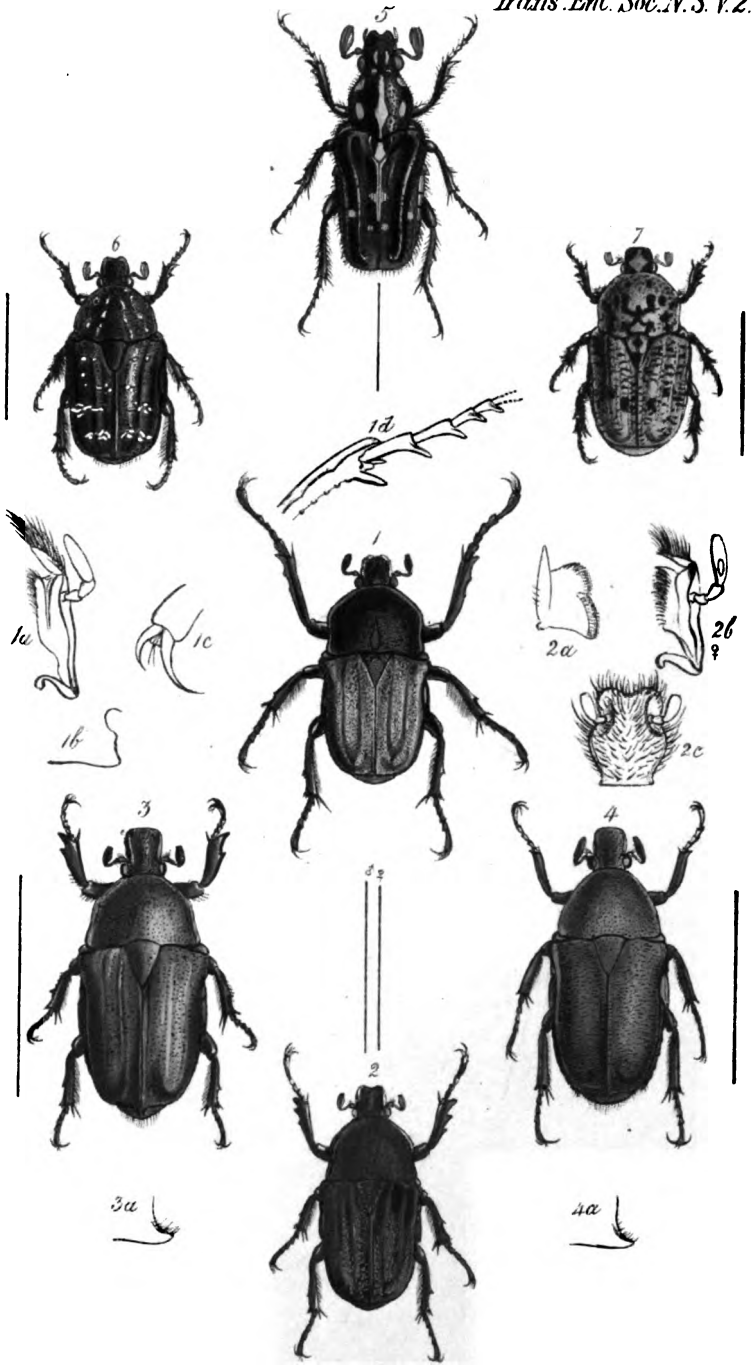

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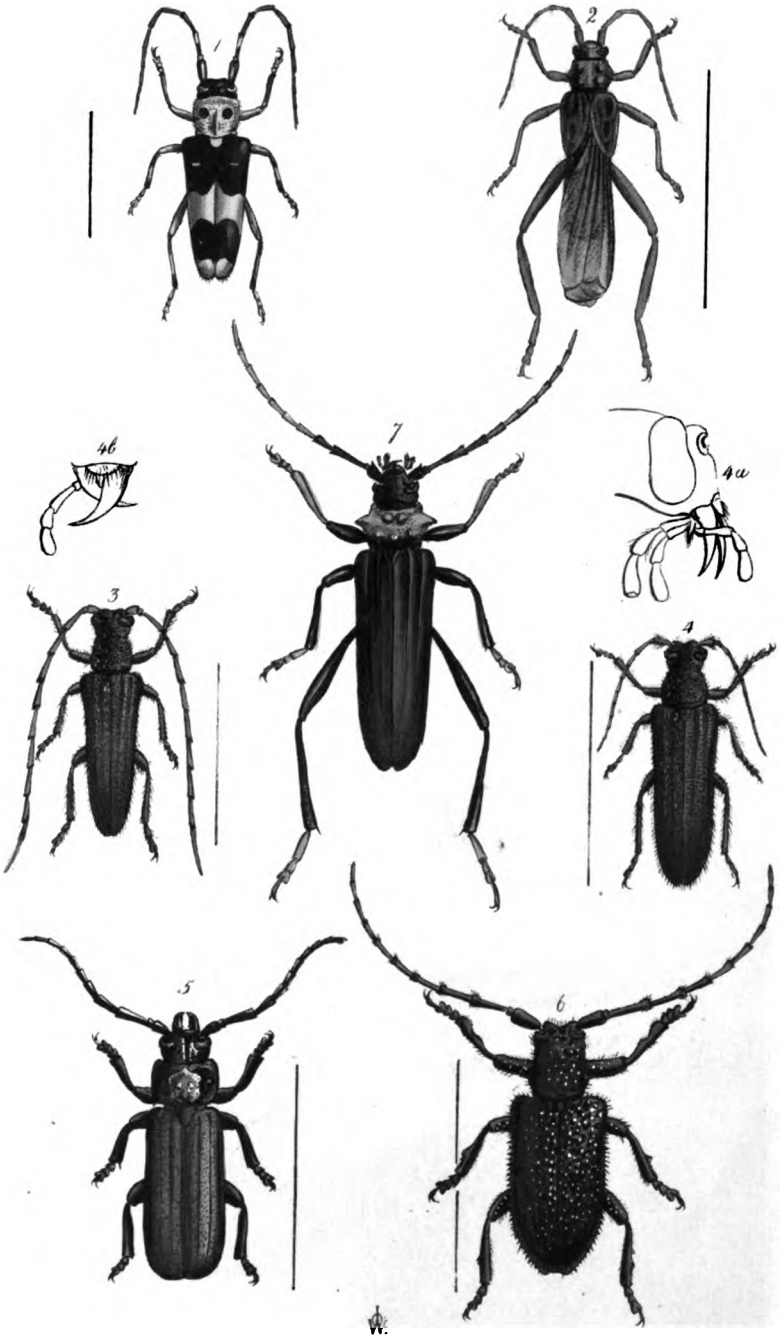

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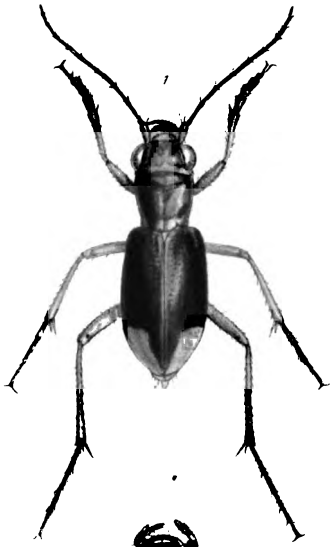

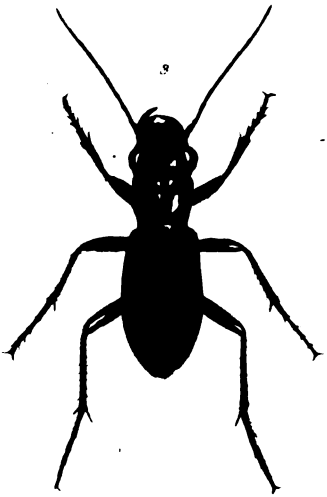

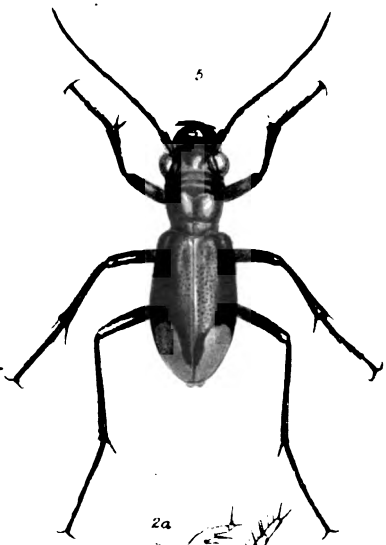

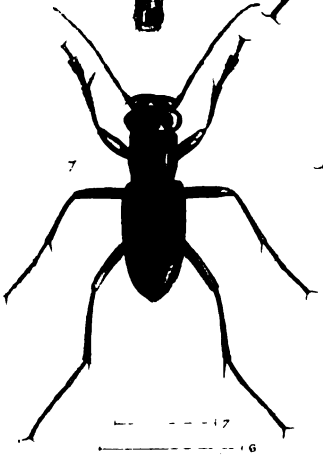

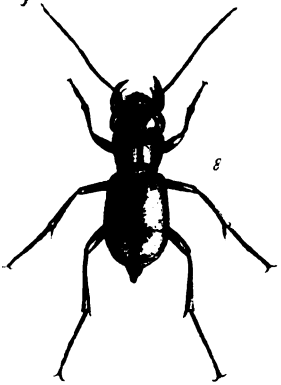

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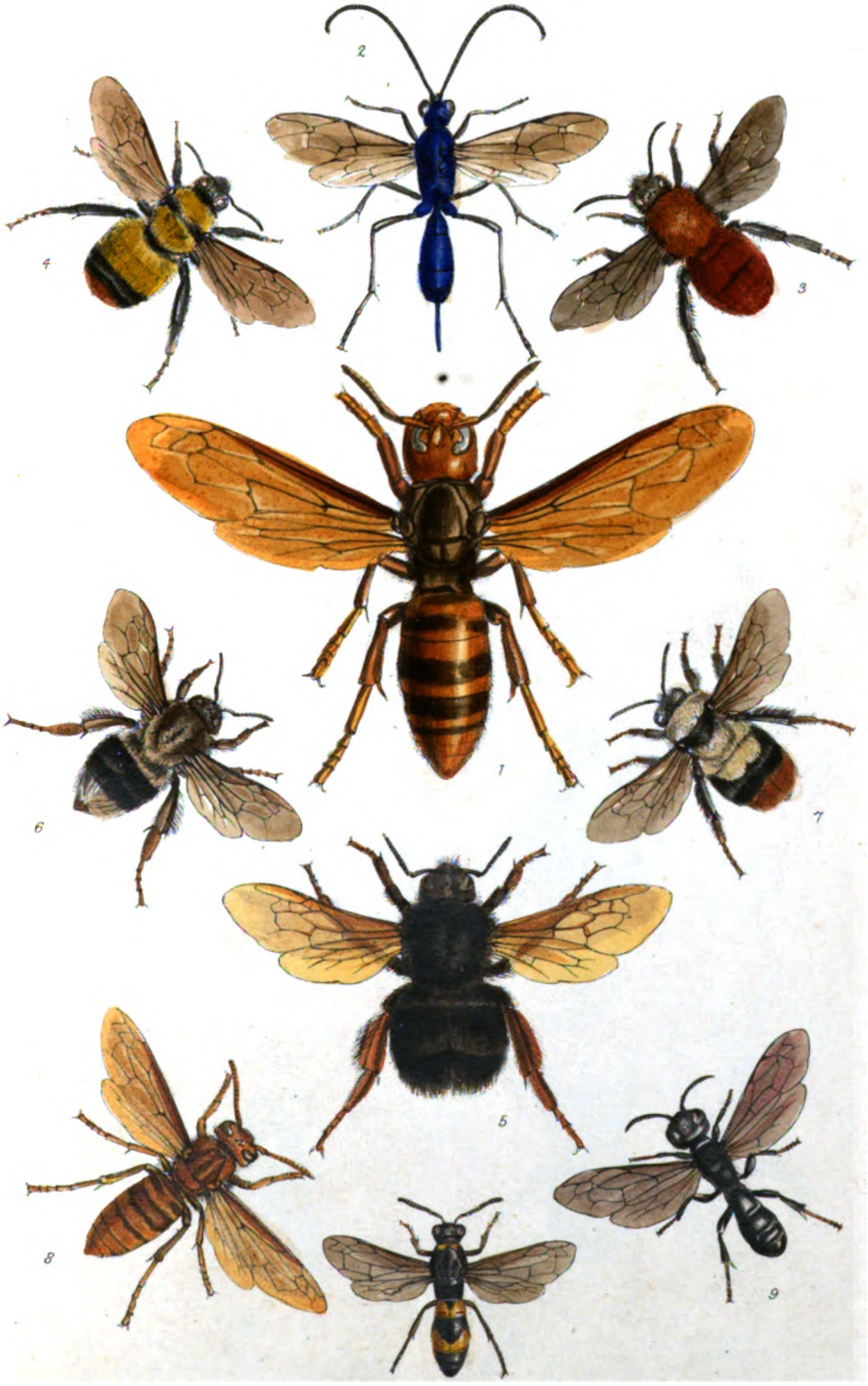

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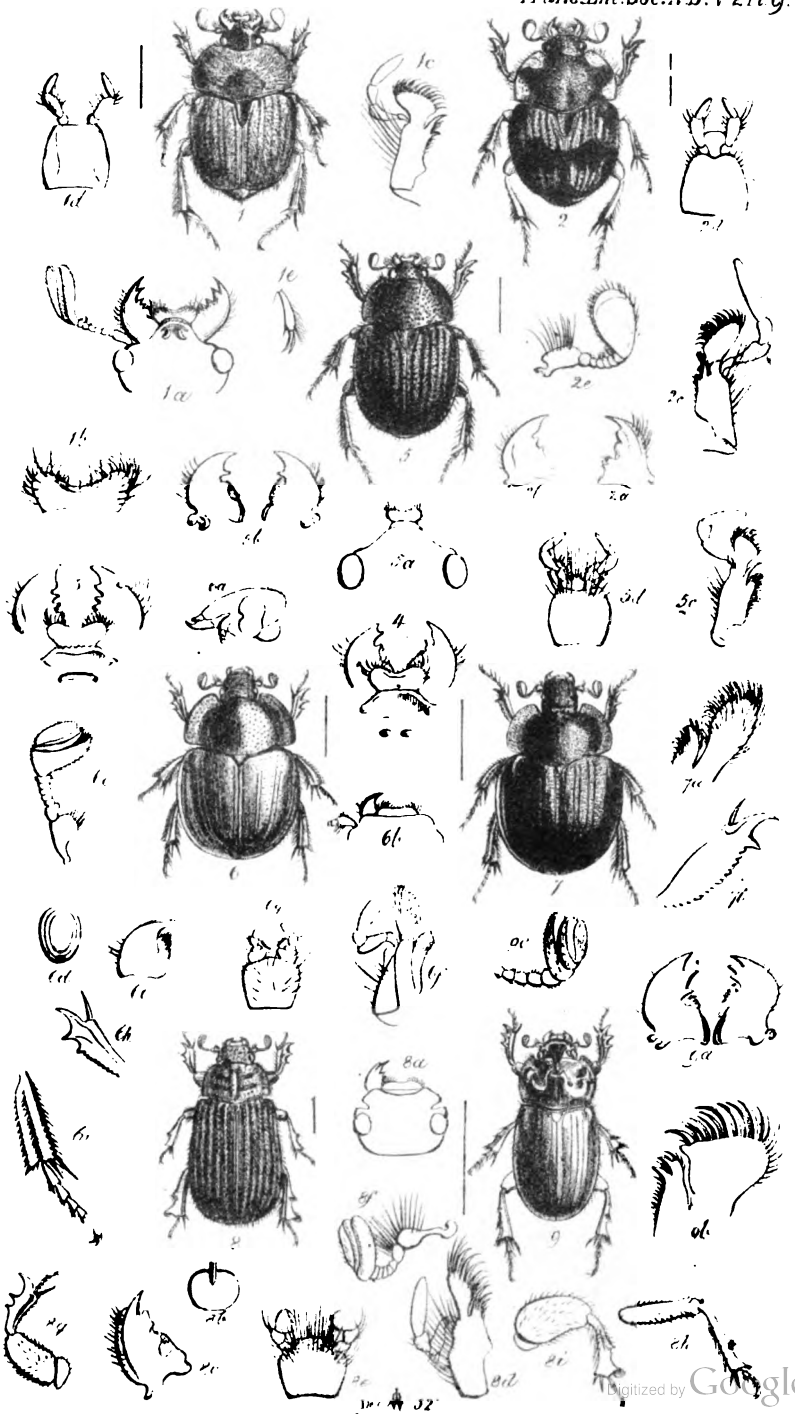

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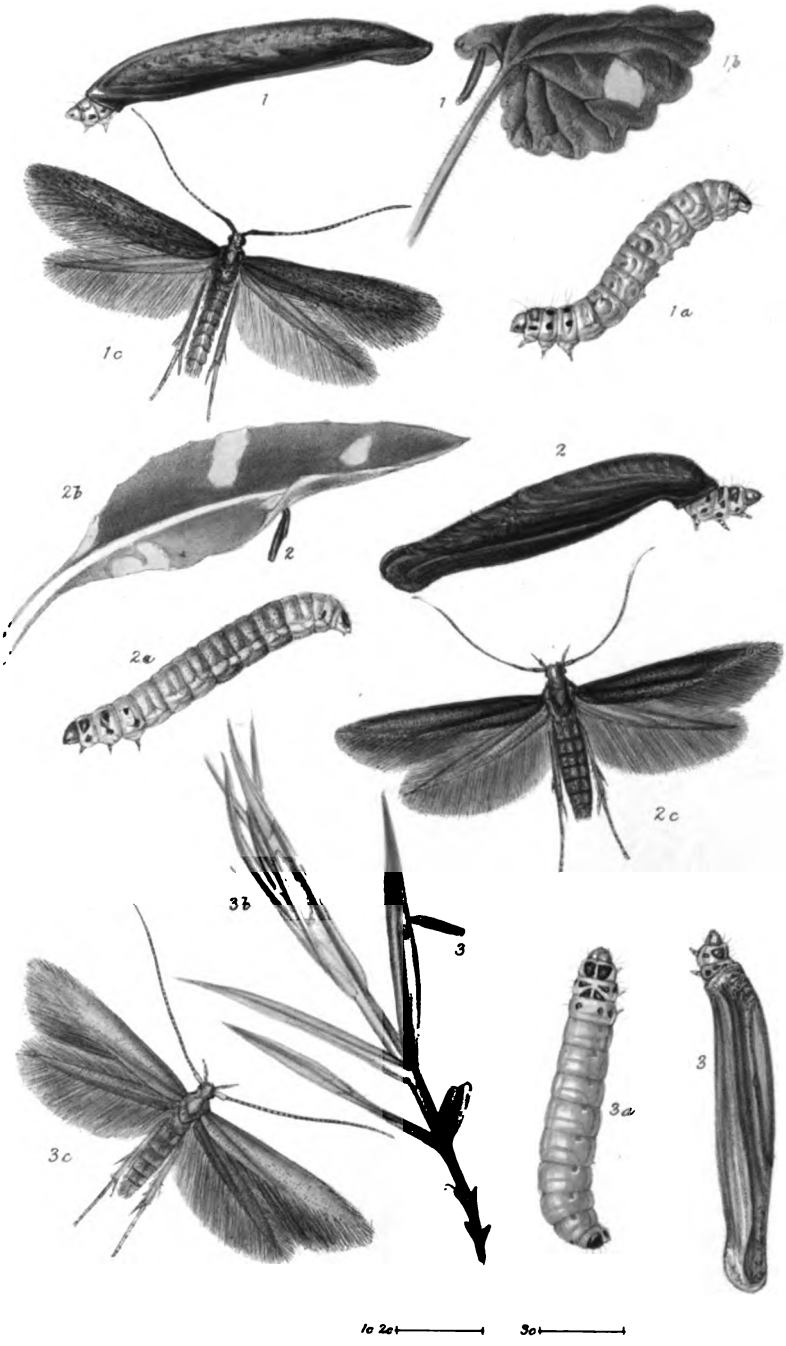

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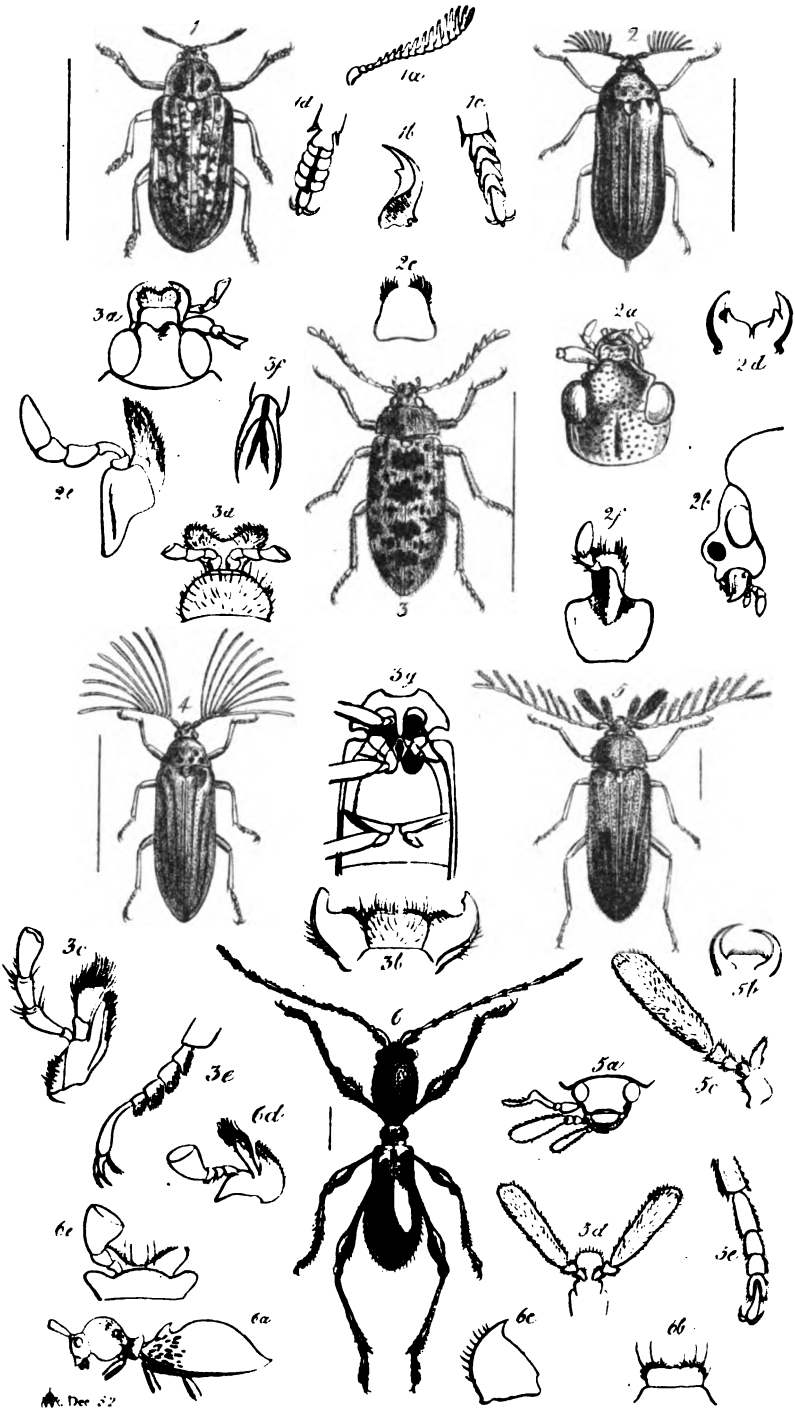

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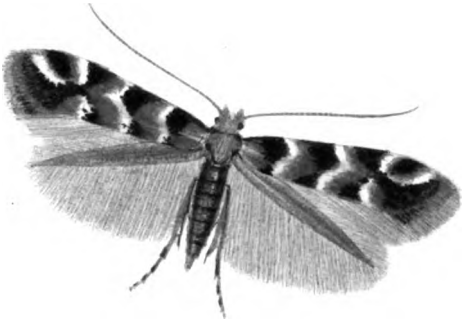

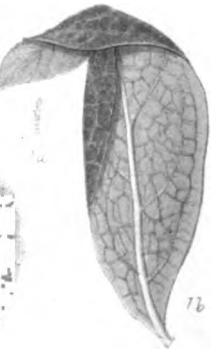

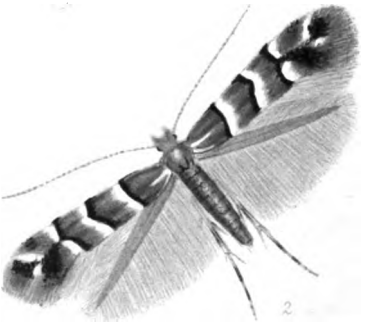

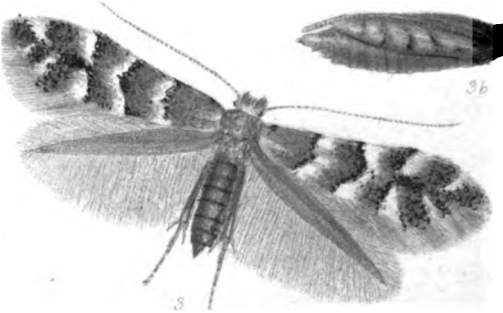

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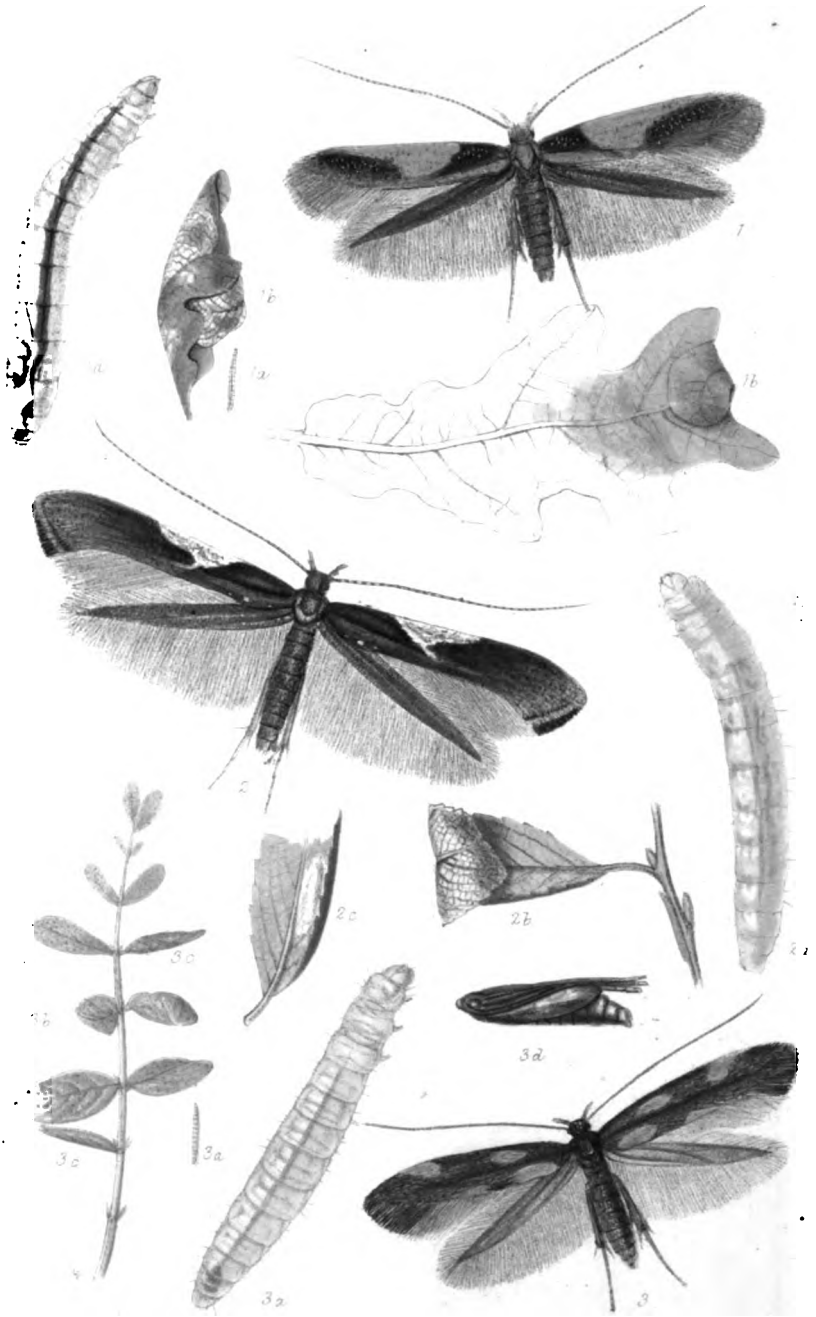

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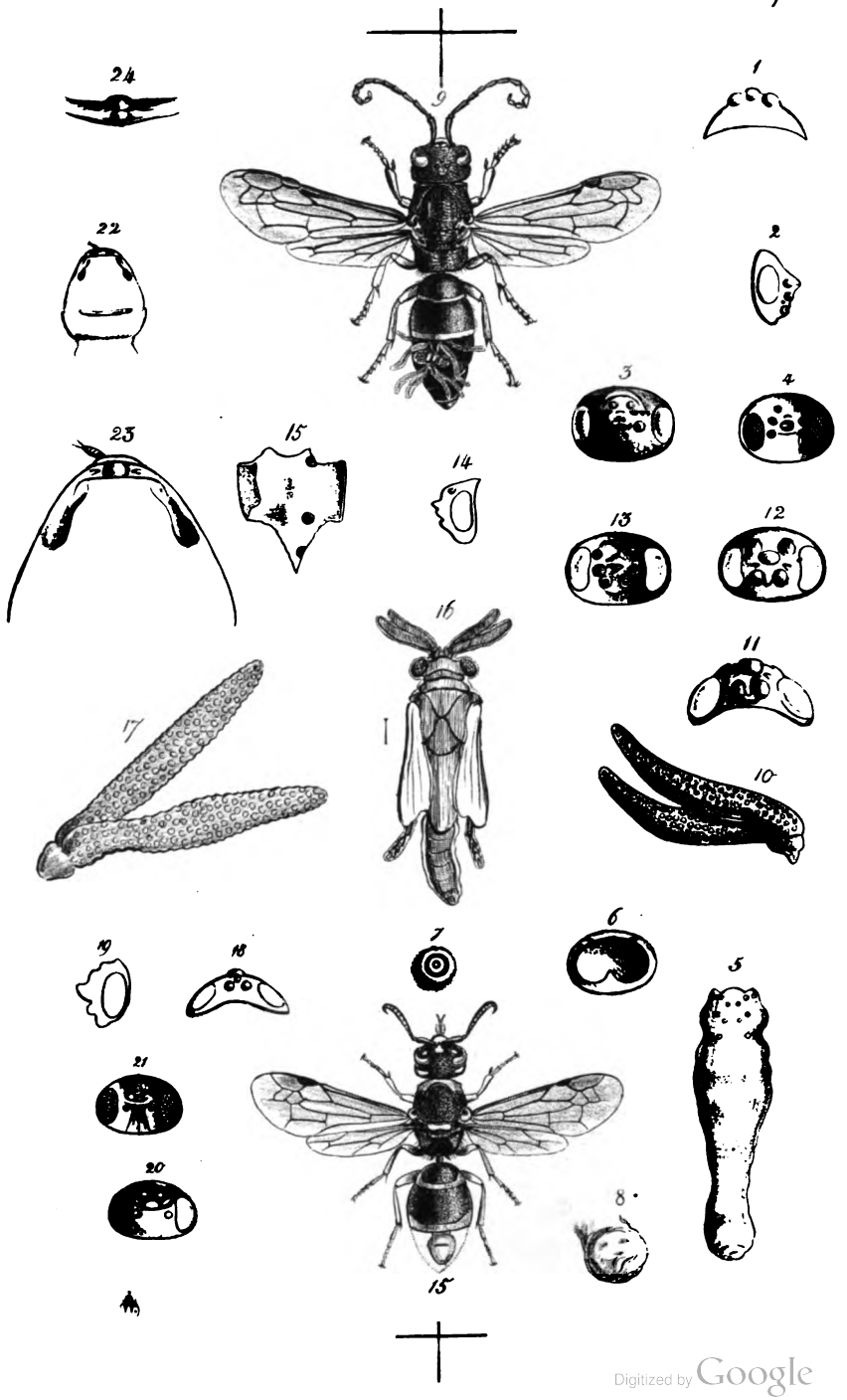

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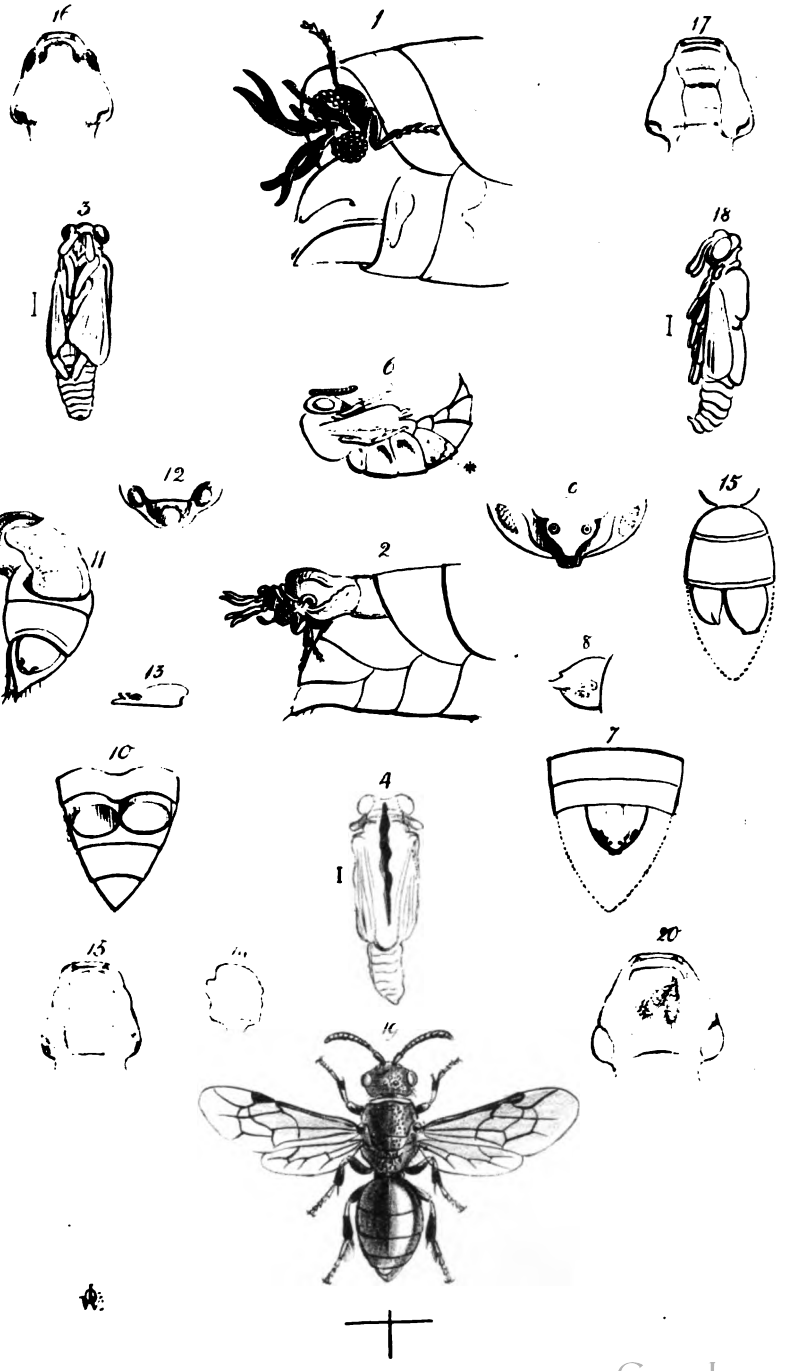

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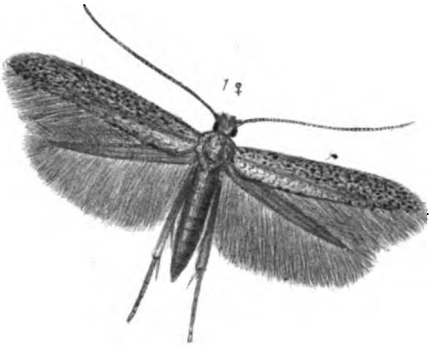

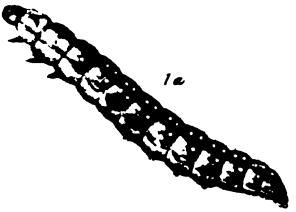

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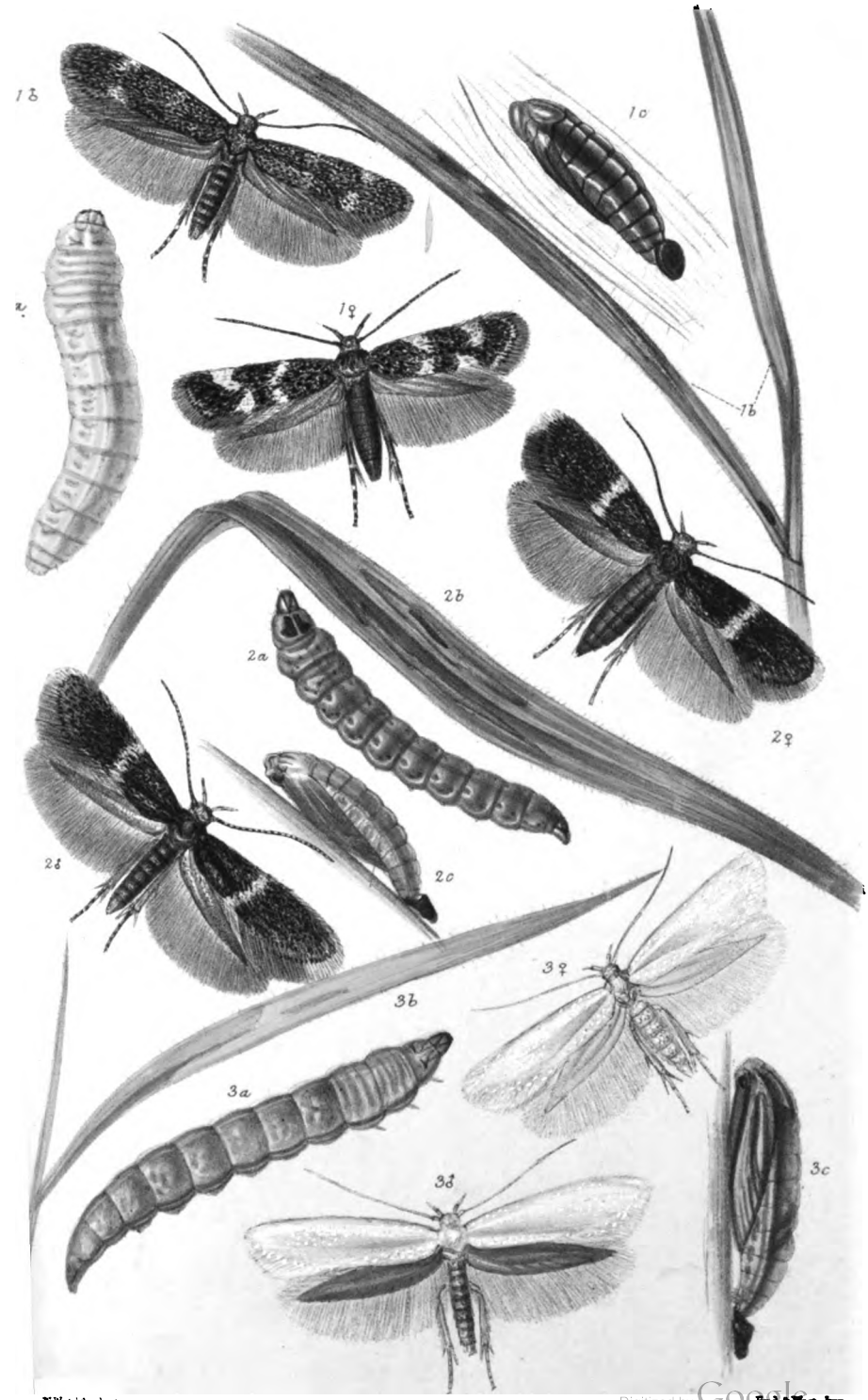

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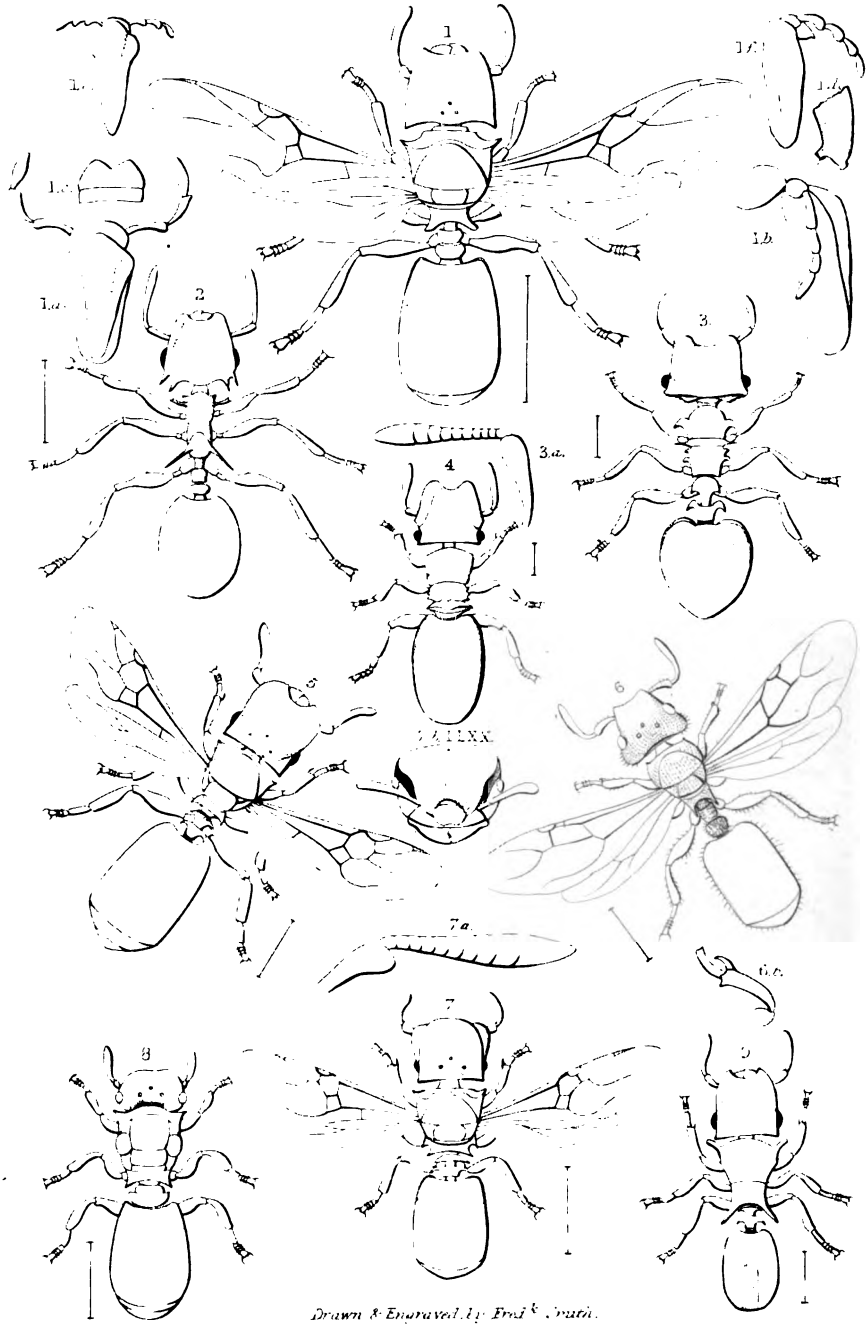

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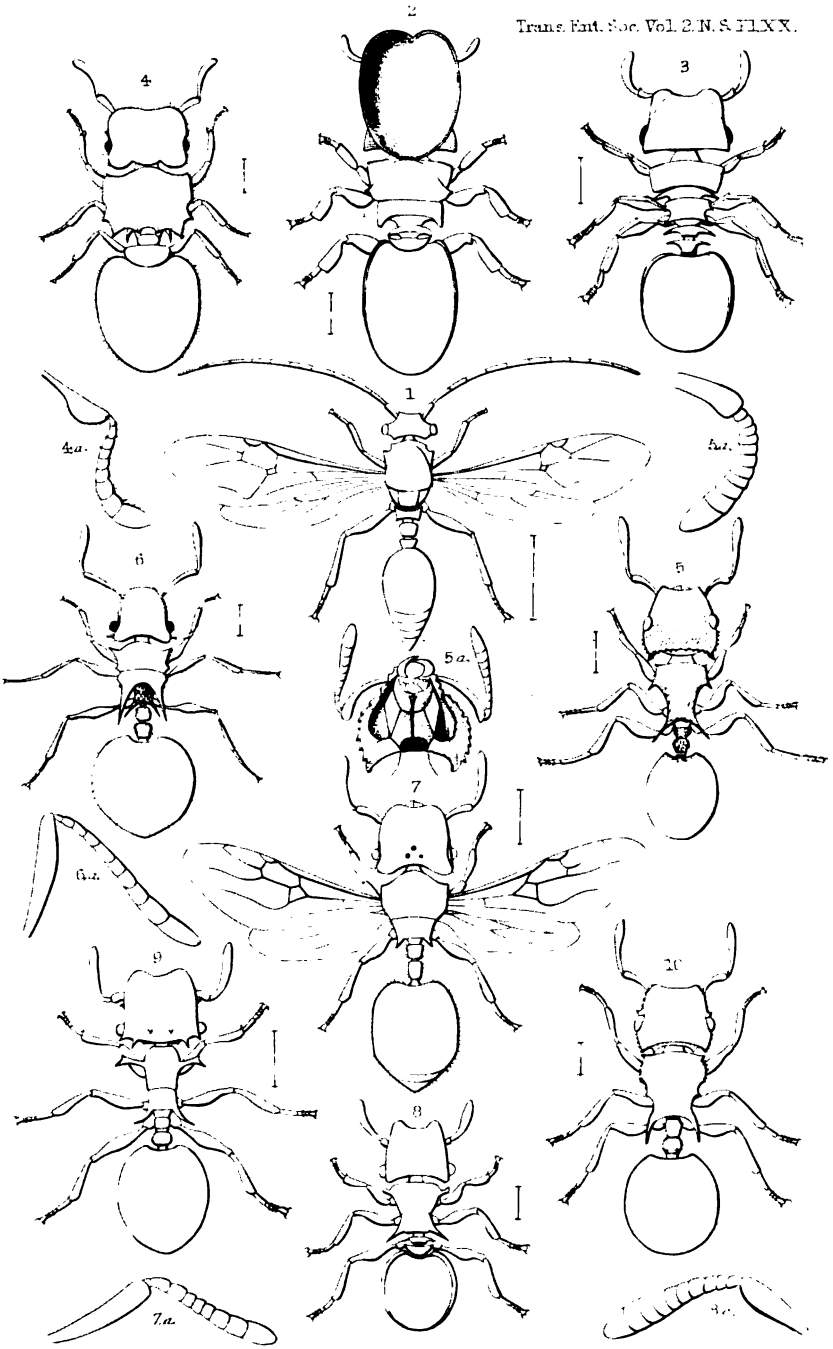

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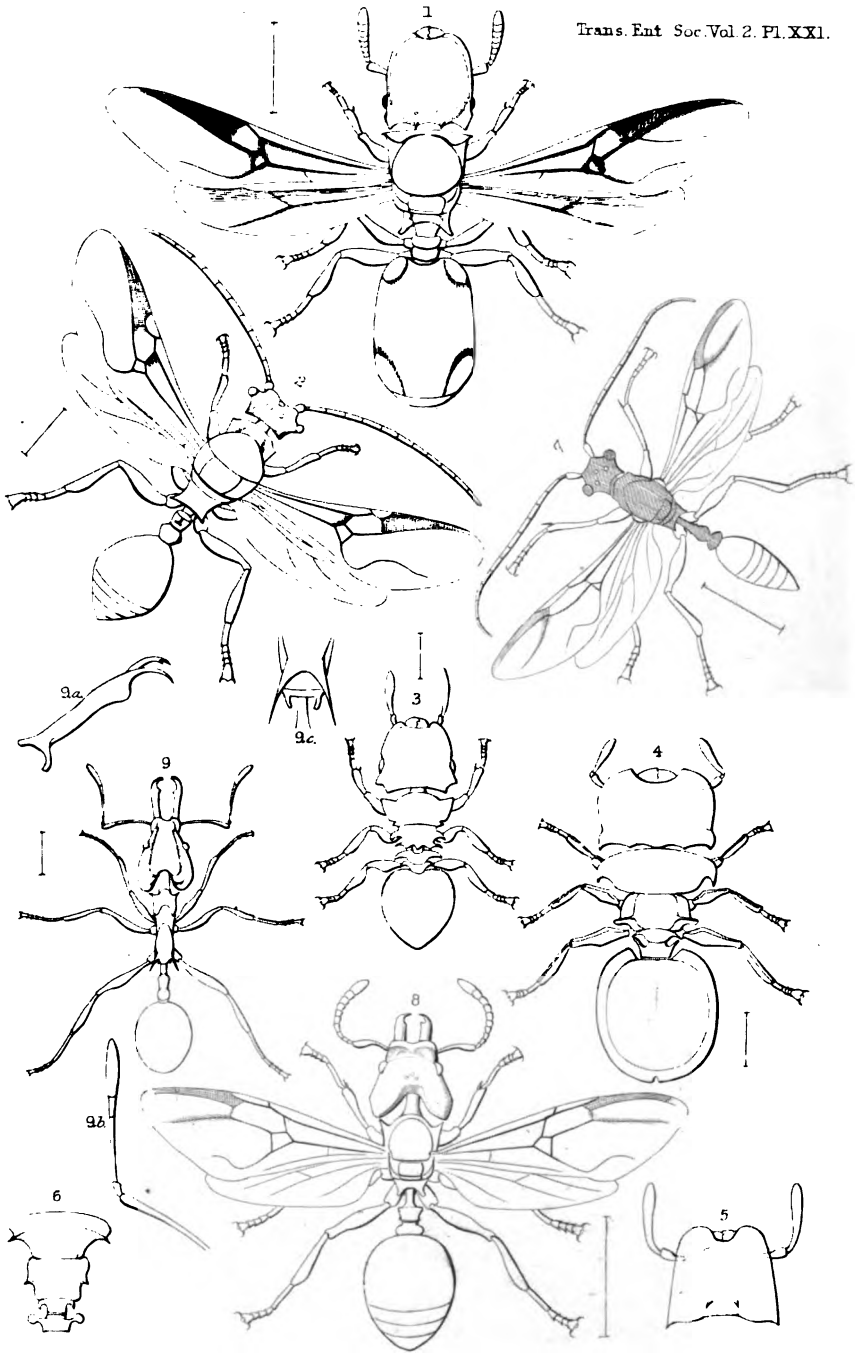

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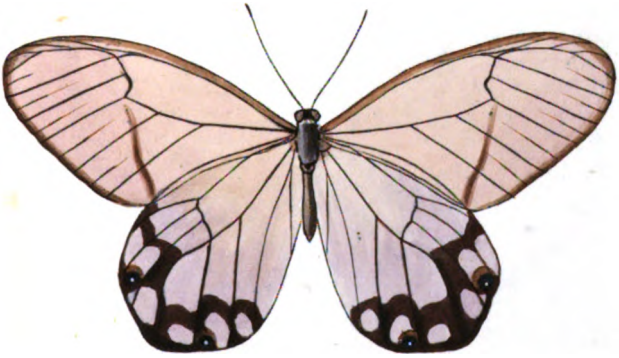

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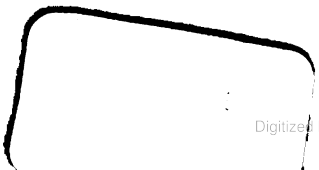

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